



# **Navy Medical newsletter**

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**January 1970**

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**Credits:** Symbolic of the birth of 1970, the cover photograph depicts the induction of a handsome, but very raw recruit. Officiating at the ceremony with aplomb is CAPT E. Paul Rucci, MC, USN, Assistant Chief of OB/GYN Service at the Naval Hospital, NNMC, Bethesda, Md. The scene was captured on film by Medical Photographer HM1 Flora. We are indebted to all 3 gentlemen, and a justifiably proud mother, for a fine picture.

Photo on page 27. CDR Burke, MC, USN, demonstrates endoscopic instruments to the GI Service at Naval Hospital, Philadelphia, Pa.

All other pictures are Official Navy Photographs. Photo on page 48 taken by HMC R. E. Havranek, USN (Ret), Audio-visual Information Specialist.

## A PRELIMINARY REPORT ON THE EFFECT OF EIGHTH REVISION ICDA ON CAUSE OF DEATH STATISTICS

Robert A. Israel, M.S., F.A.P.H.A., and A. Joan Klebba, M.A.,  
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*The introduction of the Eighth Revision of the International Classification of the Causes of Death has resulted in breaks in mortality trends for many causes. The reasons for these breaks are discussed. To deal with time trends without distortion due to changes in classification, comparability ratios have been prepared and these are explained here.*

### Introduction

Since the work of John Graunt on the London Bills of Mortality, in the 17th century, there have been attempts to compile statistics of diseases and causes of death. These efforts eventually led to a classification, adopted by the International Statistical Institute in 1893, that was based on the principle of distinguishing between general diseases and those localized in a particular organ or anatomical site. This classification received general approval and was adopted by several countries as well as by many cities. In 1898, the American Public Health Association recommended the use of this classification to the registrars of Canada, Mexico, and the United States. The Association further suggested that the classification be revised every ten years. In 1900, the first international conference met in Paris for the purpose of revising the International Classification of Causes of Death. At the meeting, the desirability of decennial revisions was recognized and revisions have been made approximately every ten years ever since. Each revision, while attempting to improve the usefulness of the classification, at the same time produced breaks in comparability in statistics between the older and newer versions of the classification. This is again the case with the introduction of the Eighth Revision International Classification of Diseases, Adapted for Use in the United States (ICDA), that was put into effect for official mortality use on January 1, 1968. The Eighth Revision ICDA is a modification of the Eighth Revision of the International Classification of Diseases (ICD).

The Eighth Revision ICDA replaces the Seventh Revision International Classification of Diseases and Causes of Death that was in use in the United States

from 1958 through 1967. The Eighth Revision contains major modifications in several sections of the classification. Also, the international rules for selecting the underlying cause of death have been modified and simplified. In addition, changes have been introduced in the special interpretations and decisions which adapt the coding procedures to reporting practices in the United States. The changes between the Seventh and Eighth Revisions of the classification and in the supporting procedures used to assign underlying causes of death make it difficult, and in some cases impossible, to interpret changes in mortality patterns by cause of death when comparing Seventh (or earlier) Revision data with Eighth Revision statistics. Consequently, measures of the degree of discontinuity in cause-of-death statistics produced by such decennial revisions are essential to interpretation of mortality trends.

### Comparability Ratios

One method of measuring the changes in cause-of-death statistics introduced by revising the classification is through the use of quantities known as comparability ratios. These ratios are based on the results of dual coding of causes of death in accordance with the two revisions in question, using the same set of death certificates in each case.

The first quantitative measure of the change in mortality statistics by cause due to a new revision was introduced by Dunn and Shackley in connection with the Fifth Revision (1938) of the International List of Causes of Death. This measurement was based on coding the certificates for all deaths occurring in 1940 by both the Fourth Revision (1929) and the Fifth Revision (1938). The results of comparing these two sets of figures were presented by positive and negative percentages that indicated the net relative amount gained or lost by each title through the introduction of the revised classification. For the revisions prior to that of 1938, Van Buren described some of the major shifts in cause-of-death statistics. However, he was not able to measure quantitatively the changes resulting from the various revisions because dual coding of death by successive revi-



sions was not done prior to the coding of the 1940 deaths by the Fourth and Fifth Revisions.

Finally, the International Conference for the Sixth Decennial Revision of the International Lists recommended that deaths for a country as a whole, in the year 1949 or 1950, should be coded according to both the Sixth Revision and the Fifth Revision in order to make it possible to compute a comparable time series of mortality rates by cause. In the United States, 1950 was selected as the data year for coding by both revisions. At that time the results of the dual coding were presented as ratios instead of as positive and negative percentages, as in 1940. Comparability ratios were again computed to measure the changes due to the adoption of the Seventh Revision in 1958. These ratios were based on the dual coding of a 10 percent sample of all deaths in 1958.

The ratios presented in this report are based on all deaths occurring in 1966 coded according to the Seventh Revision ICD, using the coding procedures in effect for that revision, and on a random sample of these same 1966 deaths stratified by cause of death (Tables A and B), and coded according to the Eighth Revision ICDA using the coding procedures in effect for this latter revision. The year 1966 was selected because it was the most recent year for which final mortality statistics, according to the Seventh Revision, were available at the time of this study. The ratios are computed by dividing the num-

bers of deaths (estimated from the stratified random sample) assigned to particular cause of death categories according to the Eighth Revision ICDA, by the numbers of deaths assigned to the most nearly comparable causes under the Seventh Revision (Tables 1 and 2). The resulting ratios measure the net effect of changes in the classification itself, changes in international rules for selecting the underlying cause of death, and modifications of other procedures and interpretations used by the National Center for Health Statistics to code the underlying cause of death on death certificates filed in the United States.

A comparability ratio of 1.00 indicates that the same number of deaths were assigned to a particular cause or combination of causes whether the Seventh or Eighth Revision was used. A ratio showing perfect correspondence (1.00) between the two revisions does not necessarily indicate that the cause was unaffected by changes in the classification and coding procedures, because compensating changes may have offset each other.

A ratio of less than 1.00 results from one of two situations: (1) a decrease in assignment of death to a cause in the Eighth Revision as compared to the Seventh, or (2) the cause as described by the Eighth Revision is not exactly the same cause as represented by the Seventh Revision titles with which it is compared; rather it is only a part of the Seventh Revision title with which it is compared.

TABLE A.—List of comparable category numbers for selected causes of death according to the Eighth and Seventh Revisions, and size of sample required for selected causes by the Seventh Revision: for monthly vital statistics report and annual summary of provisional statistics

Strata	List title according to the Eighth Revision of the International Classification of Diseases, 1967	Category numbers according to the Eighth Revision, 1967	Category numbers according to the Seventh Revision, 1955	Number of deaths in 1966 (final count), by the Seventh Revision	Number of deaths required in sample
		(1)	(2)	(3)	(4)
	All causes .....			1,863,149	95,168
1	Enteritis and other diarrheal diseases ....	008, 009	571,764	3,336	1,429
2	Tuberculosis, all forms .....	010-019	001-019	7,625	1,883
3	Syphilis and its sequelae .....	090-097	020-029	2,193	1,168
4	Other infective and parasitic diseases ...	Remainder of 000-136	030-138	7,496	1,875
	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues .....	140-209	140-205		By addition:
5	Malignant neoplasm of buccal cavity and pharynx .....	140-149	140-148	6,800	1,828
6	Malignant neoplasm of digestive organs and peritoneum .....	150-159	150-156A, 157-159	95,079	2,436
7	Malignant neoplasm of respiratory system .....	160-163	160-164	54,934	2,391
8	Malignant neoplasm of breast .....	174	170	27,533	2,292
9	Malignant neoplasm of genital organs	180-187	171-179	40,378	2,354
10	Malignant neoplasm of urinary organs	188, 189	180, 181	14,166	2,125

Strata	List title according to the Eighth Revision of the International Classification of Diseases, 1967	Category numbers according to the Eighth Revision, 1967 (1)	Category numbers according to the Seventh Revision, 1955 (2)	Number of deaths in 1966 (final count), by the Seventh Revision (3)	Number of deaths required in sample (4)
11	Malignant neoplasm of all other and unspecified sites .....	170-173, 190-199	156B, 165, 190-199	35,032	2,333
12	Leukemia and aleukemia .....	204-207	204	14,012	2,121
13	Other neoplasms of lymphatic and hematopoietic tissues .....	200-203, 208, 209	200-203, 205	15,802	2,159
14	Benign neoplasms and neoplasms of unspecified nature .....	210-239	210-239	4,923	1,658
15	Diabetes mellitus .....	250	260	34,597	2,332
16	Anemias .....	280-285	290-293	3,452	1,450
17	Meningitis .....	320	340	2,324	1,204
	Major cardiovascular diseases .....	390-448	330-334, 400-456		By addition:
	Diseases of heart .....	390-398, 402, 404, 410-429	400-443		By addition:
18	Active rheumatic fever and chronic rheumatic heart disease .....	390-398	400-402, 410-416	15,012	2,143
19	Hypertensive heart disease with or without renal disease .....	402, 404	440, 441, 442, 443	54,176	2,389
20	Ischemic heart disease .....	410-414	420, 422.1	615,126	2,490
21	Chronic disease of endocardium and other myocardial insufficiency .....	424, 428	421, 422.0, 422.2	11,646	2,058
22	All other forms of heart disease .....	420-423, 425-427, 429	430-434	31,042	2,314
23	Hypertension .....	400, 401, 403	444-447	11,380	2,050
24	Cerebrovascular disease .....	430-438	330-334	204,841	2,470
25	Arteriosclerosis .....	440	450	38,907	2,349
26	Other diseases of arteries, arterioles, and capillaries .....	441-448	451-456	15,213	2,147
27	Acute bronchitis and bronchiolitis .....	466	500	987	708
	Influenza and pneumonia .....	470-474, 480-486	480-483, 490-493, 763		By addition:
28	Influenza .....	470-474	480-483	2,830	1,327
29	Pneumonia .....	480-486	490-493, 763	63,262	2,405
	Bronchitis, emphysema, and asthma .....	490-493	501, 502, 527.1, 241		By addition:
30	Chronic and unqualified bronchitis .....	490, 491	501, 502	5,164	1,684
31	Emphysema .....	492	527.1	20,252	2,225
32	Asthma .....	493	241	4,324	1,584
33	Peptic ulcer .....	531-533	540, 541	10,321	2,013
34	Hernia and intestinal obstruction .....	550-553, 560	560, 561, 570	10,078	2,003
35	Cirrhosis of liver .....	571	581	26,692	2,286
36	Cholelithiasis, cholecystitis and cholangitis .....	574, 575	584, 585	4,592	1,619
37	Nephritis and nephrosis .....	580-584	590-594	11,540	2,055
38	Infections of kidney .....	590	600	9,498	1,980
39	Hyperplasia of prostate .....	600	610	3,217	1,407
40	Congenital anomalies .....	740-759	750-759	18,158	2,197
41	Certain causes of mortality in early infancy .....	760-769.2, 769.4-772, 774-778	760-762, 765-776	48,917	2,378
42	Symptoms and ill-defined conditions .....	780-796	780-795	23,960	2,264
43	All other diseases .....	Residual	By subtraction:	85,808	2,429
	Accidents .....	E800-E949	E800-E962		By addition:
44	Motor vehicle accidents .....	E810-E823	E810-E835	53,041	2,387
45	All other accidents .....	E800-E807, E825-E949	E800-E802, E840-E962	60,522	2,401
46	Suicide .....	E950-E959	E963, E970-E979	21,281	2,237
47	Homicide .....	E960-E978	E964, E980-E985	11,606	2,057
	All other external causes .....	E980-E999	—	—	—
48	Injury undetermined whether accidentally or purposely inflicted <sup>1</sup> .....	E980-E989	—	—	—
49	Injury resulting from operations of war .....	E990-E999	E990-E999, E965	74	74

<sup>1</sup> This is a new category according to the Eighth Revision. Based on a random sample of 195 deaths assigned to this new category, it includes terms which were classified in the seventh Revision primarily under E800-E962. "Accidents," 76 deaths; and under E963, E970-E979 "Suicide," 100 deaths. The remaining 19 of the 195 deaths were distributed over homicide and other categories of the Eighth Revision.

TABLE B.—List of comparable category numbers for selected causes of infant death according to the Eighth and Seventh Revisions, and size of sample required for selected causes by the Seventh Revision: for monthly vital statistics report and annual summary of provisional statistics

Strata	List title according to the Eighth Revision of the International Classification of Diseases, 1967	Category numbers according to the Eighth Revision, 1967	Category numbers according to the Seventh Revision, 1955	Number of deaths in 1966 (final)	Number of deaths required in sample
	All causes .....			85,516	15,357
1	Certain gastrointestinal diseases .....	004, 006–009, 535, 561, 563	045–048, 543, 571, 572, 764	1,646	993
2	Influenza and pneumonia .....	470–474, 480–486	480–483, 490–493, 763	9,438	1,977
3	Congenital anomalies .....	740–759	750–759	12,200	2,075
4	Birth injuries .....	764–768 (.0–.3), 772	760, 761	7,088	1,848
5	Asphyxia of newborn, unspecified .....	776.9	762	13,956	2,120
6	Immaturity unqualified .....	777	776	13,228	2,103
7	Other diseases of early infancy .....	Remainder of 760–778 <sup>1</sup>	765–774	14,609	2,135
8	All other causes (residual) .....	By subtraction: Total minus strata 1–7	By subtraction: Total minus strata 1–7	13,351	2,106

<sup>1</sup> Assumes the value of 773 will be zero.

TABLE 1.—Comparability ratios for selected causes: based on a stratified random sample of 1966 deaths assigned according to the Eighth Revision and on all deaths assigned according to the Seventh Revision of the International Classification of Diseases: United States

Cause of death (Eighth Revision of the International Classification of Diseases, 1967)	Number of deaths assigned according to—		Provisional comparability ratio <sup>1</sup>	95 percent confidence limits <sup>a</sup>	
	Eighth Revision (estimated from sample) (1)	Seventh Revision (total count) <sup>1</sup> (2)		Upper (4)	Lower (5)
All causes .....		1,863,149			
Enteritis and other diarrheal diseases .....	008, 009	3,954	3,336	1.185	1.265
Tuberculosis, all forms .....	010–019	7,244	7,625	0.950	0.981
Syphilis and its sequelae .....	090–097	707	2,193	0.322	0.341
Other infective and parasitic diseases .....	Remainder of 000–136	7,369	7,496	0.983	1.023
Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues .....	140–209	300,210	303,736	0.988	0.993
Malignant neoplasm of buccal cavity and pharynx .....	140–149	7,172	6,800	1.055	1.028
Malignant neoplasm of digestive organs and peritoneum .....	150–159	89,139	95,079	0.938	0.946
Malignant neoplasm of respiratory system .....	160–163	56,242	54,934	1.024	1.030
Malignant neoplasm of breast .....	174	27,293	27,533	0.991	0.996
Malignant neoplasm of genital organs .....	180–187	40,318	40,378	0.999	1.005
Malignant neoplasm of urinary organs .....	188, 189	14,350	14,166	1.013	1.027
Malignant neoplasm of all other and unspecified sites .....	170–173, 190–199	35,033	35,032	1.000	1.025
Leukemia and aleukemia .....	204–207	13,980	14,012	0.998	1.006
Other neoplasms of lymphatic and hematopoietic tissues .....	200–203, 208, 209	16,683	15,802	1.056	1.076
Benign neoplasms and neoplasms of unspecified nature .....	210–239	4,767	4,923	0.968	1.008
Diabetes mellitus .....	250	34,376	34,597	0.994	1.003
Anemias .....	280–285	3,259	3,452	0.944	1.008
Meningitis .....	320	2,229	2,324	0.959	1.003
Major cardiovascular diseases .....	390–448	995,985	997,343	0.999	1.002
Diseases of heart .....	390–398, 402, 404, 410–429	727,348	727,002	1.000	1.004
Active rheumatic fever and chronic rheumatic heart disease .....	390–398	17,081	15,012	1.138	1.173
Hypertensive heart disease with or without renal disease .....	402, 404	21,575	54,176	0.398	0.418
Ischemic heart disease .....	410–414	654,172	615,126	1.063	1.067
Chronic disease of endocardium and other myocardial insufficiency .....	424, 428	9,644	11,646	0.828	0.878
All other forms of heart disease .....	420–423, 425–427, 429	24,876	31,042	0.801	0.826
Hypertension .....	400, 401, 403	9,336	11,380	0.820	0.847
Cerebrovascular disease .....	430–438	200,938	204,841	0.981	0.987
Arteriosclerosis .....	440	34,796	38,907	0.894	0.916
Other diseases of arteries, arterioles, and capillaries .....	441–448	23,567	15,213	1.549	1.617
Acute bronchitis and bronchiolitis .....	466	1,179	987	1.195	1.330
Influenza and pneumonia .....	470–474, 480–486	65,627	66,092	0.993	1.004
Influenza .....	470–474	2,718	2,830	0.960	0.978
Pneumonia .....	480–486	62,909	63,262	0.994	1.006

See footnotes at end of table.



Cause of death (Eighth Revision of the International Classification of Diseases, 1967)	Number of deaths assigned according to—		Provisional comparability ratio <sup>2</sup>	95 percent confidence limits <sup>3</sup>	
	Eighth Revision (estimated from sample)	Seventh Revision (total count) <sup>1</sup>		Upper	Lower
	(1)	(2)	(3)	(4)	(5)
Bronchitis, emphysema, and asthma . . . . .	490-493	29,767	29,959	0.994	1.019
Chronic and unqualified bronchitis . . . . .	490, 491	5,513	5,164	1.068	1.170
Emphysema . . . . .	492	21,243	20,252	1.049	1.059
Asthma . . . . .	493	3,011	4,324	0.696	0.813
Peptic ulcer . . . . .	531-533	10,106	10,321	0.979	1.047
Hernia and intestinal obstruction . . . . .	550-553, 560	7,633	10,078	0.757	0.780
Cirrhosis of liver . . . . .	571	26,775	26,692	1.003	1.014
Cholelithiasis, cholecystitis and cholangitis . . . . .	574, 575	4,509	4,592	0.982	1.005
Nephritis and nephrosis . . . . .	580-584	10,151	11,540	0.880	0.896
Infections of kidney . . . . .	590	9,747	9,498	1.026	1.053
Hyperplasia of prostate . . . . .	600	2,909	3,217	0.904	0.920
Congenital anomalies . . . . .	740-759	18,304	18,158	1.008	1.025
Certain causes of mortality in early infancy . . . . .	760-769.2, 769.4-772, 774-778	47,360	48,917	0.968	0.977
Symptoms and ill-defined conditions . . . . .	780-796	23,815	23,960	0.994	1.022
All other diseases . . . . .	Residual	80,681	85,808	0.940	0.958
Accidents . . . . .	E800-E949	105,137	113,563	0.926	0.935
Motor vehicle accidents . . . . .	E810-E823	51,662	53,041	0.974	0.975
All other accidents . . . . .	E800-E807, E825-E949	53,475	60,522	0.884	0.900
Suicide . . . . .	E950-E959	19,990	21,281	0.939	0.950
Homicide . . . . .	E960-E978	11,527	11,606	0.993	1.004
All other external causes . . . . .	E980-E999	3,059	—	—	—
Injury undetermined whether accidentally or purposely inflicted . . . . .	E980-E989	2,959	—	—	—
Injury resulting from operations of war . . . . .	E990-E999	68	74	0.919	0.919

<sup>1</sup> Figures in this column are number of deaths in 1966 assigned to the categories in the Seventh Revision selected as the most nearly comparable to the Eighth Revision categories, as shown in table A.

<sup>2</sup> Ratio of deaths assigned according to the Eighth Revision to deaths assigned according to the Seventh Revision.

<sup>3</sup> The probability is 95 percent that the true comparability ratio will have a value between the upper and lower limits shown.

TABLE 2.—Comparability ratios for selected causes of infant deaths: based on a stratified random sample of 1966 infant deaths assigned according to the Eighth Revision and on all infant deaths in 1966 assigned according to the Seventh Revision of the International Classification of Diseases: United States

Cause of death (Eighth Revision of the International Classification of Diseases, 1967)	Number of deaths assigned according to—		Provisional comparability ratio <sup>1</sup>	95 percent confidence limits <sup>2</sup>	
	Eighth Revision (estimated from sample)	Seventh Revision (total count)		Upper	Lower
	(1)	(2)	(3)	(4)	(5)
All causes . . . . .		85,516			
Certain gastrointestinal diseases . . . . .	004, 006-009, 535, 561, 563	1,770	1,646	1.075	1.113
Influenza and pneumonia . . . . .	470-474, 480-486	10,146	9,438	1.075	1.137
Congenital anomalies . . . . .	740-759	12,644	12,200	1.036	1.073
Birth injuries . . . . .	764-768(.0-3), 772	2,336	7,088	0.330	0.391
Asphyxia of newborn, unspecified . . . . .	776.9	12,155	13,956	0.871	0.893
Immaturity unqualified . . . . .	777	11,482	13,228	0.868	0.912
Other diseases of early infancy . . . . .	Reminder of 760-778 <sup>3</sup>	21,571	14,609	1.477	1.505
All other causes . . . . .	Residual	13,410	13,351	1.004	1.025

<sup>1</sup> Ratio of deaths assigned according to the Eighth Revision to deaths assigned according to the Seventh Revision.

<sup>2</sup> The probability is 95 percent that the true comparability ratio will have a value between the upper and lower limits shown.

<sup>3</sup> Assumes the value of 773 will be zero.

Usually, a ratio of more than 1.00 results from an increase in assignments of death to a cause in the Eighth Revision as compared with the Seventh. At times the increase may result, however, from the fact that the Eighth Revision cause is not the equivalent

of that described by the Seventh Revision title with which it is compared.

#### List of Ratios Presented in this Report

The ratios presented in this report are provisional



and the causes to which they refer have been selected to allow interpretation and analysis of the condensed list of causes of death presented in the publication, "Monthly Vital Statistics Report," issued by the National Center for Health Statistics. This publication shows national mortality statistics on a relatively current basis based on a 10 percent sample of deaths occurring each month. Comparability ratios for more detailed cause-of-death groups by age, sex, and color are planned as part of a subsequent phase of this study based on a larger sample of 1966 deaths.

### Major Features and Changes in the Classification

The detailed list of the Eighth Revision ICDA consists of 671 categories of diseases and morbid conditions plus 182 categories for classification of external causes of injury and 187 categories for the characterization of injuries according to the nature of the lesion. These detailed categories are designated by three-digit numbers. In addition, there are four-digit subcategories in the ICDA that provide further specificity or more information regarding etiology or manifestations of the disease.

The classification is arranged in 17 main sections or chapters. The important changes are summarized for each of these sections in the *Introduction* (pp. xxiv-xxvii) to the Eighth Revision ICDA. Among the many changes, those most pertinent to the causes of death and the corresponding ratios presented in this report are the following:

*Infective and Parasitic Diseases*—In the Seventh Revision, list titles for diarrheal conditions were scattered over several sections of the classification. In the Eighth Revision all of the Seventh Revision subdivisions for these conditions, including those for infants, are brought together under one category, *Diarrheal disease* (ICDA No. 009).

*Diseases of the Nervous System and Sense Organs*—*Vascular lesions affecting the central nervous system* (ICD Nos. 330-334) in the Seventh Revision has been transferred in the Eighth Revision to Section VII, "Diseases of the circulatory system," where they appear as *Cerebrovascular disease* (ICDA Nos. 430-438).

*Certain Causes of Perinatal Morbidity and Mortality*—This section represents an integration of the former Chapter X, "Certain diseases of early infancy" and the "Classification of causes of still-birth" (ICD Nos. Y30-Y39) in the Seventh Revision. The age qualifications used in previous revisions to classify the same conditions in or outside this

section have been deleted. For example, *Pneumonia of the newborn* (ICD No. 763) of the Seventh Revision is no longer in this section. Instead, it is included with the pneumonias at all ages (ICDA Nos. 480-486).

*Accidents, Poisonings and Violence*—A new subsection (ICDA Nos. E980-E989) has been introduced for the classification of deaths where it was not possible for the certifier to determine whether the injuries were accidentally or purposely inflicted.

### Selection of Comparable Cause- of-Death Titles

The purpose of the comparability ratio is to serve as a factor to adjust data published during the Seventh Revision to the level which they would have had under the Eighth Revision. The Seventh Revision category numbers shown in Tables A and B were selected from the *List of 258 Selected Causes of Death* and the *List of 55 Selected Causes of Infant Death* which have been used by the National Center for Health Statistics for compiling mortality statistics. These are the most detailed cause-of-death lists for which national mortality statistics were regularly published by age, color, and sex during the period when the Seventh Revision was in use (1958-1967). Using these two lists, therefore, provides for the largest possible number of comparability ratios for causes of death by age, color, and sex. These ratios by age, color, and sex will be presented in a report of the previously mentioned enlarged study of comparability data.

### Computation of Estimated Comparability Ratios and Precision of the Estimates

Each of the ratios in Tables 1 and 2 has been computed by dividing the number of deaths assigned to a particular cause or group of causes, using the Eighth Revision, ICDA, by the number of deaths assigned to the equivalent cause or group of causes by the Seventh Revision.

The sizes of the strata in the random sample stratified by cause of death to estimate the numerators of the ratios are shown in Tables A and B. The numbers of deaths in column (4) of these tables are the sizes of the samples estimated to be necessary to obtain results of the specified precision (with the maximum error to be tolerated set at approximately 5 percent).

Since the ratios obtained by this method are subject to sampling error in the numerator (but not in the denominator), the ratios themselves are also

subject to sampling error and are, therefore, estimates of the true comparability ratios. The standard errors of the estimates of the true comparability ratios have been computed and confidence intervals for these true values are presented in columns (4) and (5) of Tables 1 and 2. These figures are pairs of positive numbers such that the probability that the true value of the comparability ratio is included in the interval defined by them is 95 percent.

## Practical Application of Ratios

Table 3 illustrates the application of comparability ratios to determine whether changes for certain death rates might be real changes or merely the result of the introduction of a revised classification supported by modified procedures. The data presented in Table 3 are derived from a 10 percent sample of deaths occurring in the United States during two periods: January-June, 1967, and January-June, 1968.

TABLE 3.—Comparison of death rates for specified causes, January-June, 1967, revised by application of comparability ratios, and corresponding death rates for January-June, 1968

Eighth Revision title		Comparability ratio (1)	Death rate per 100,000 population: January-June		
			1967:		Revised by ratio in (1) (4)
			Seventh Revision	Reported (3)	
Syphilis and its sequelae	(090-097)	0.322	0.5	1.3	0.4
Hypertensive heart disease with or without renal disease	(402,404)	0.398	9.7	26.6	10.6
Active rheumatic fever and chronic rheumatic heart disease	(390-398)	1.138	8.7	7.6	8.6
Asthma	(493)	0.696	1.4	2.0	1.4
Hernia and intestinal obstruction	(550-553,560)	0.757	3.7	5.1	3.9
Cholelithiasis, cholecystitis and cholangitis	(574,575)	0.982	2.4	1.9	1.9
Hyperplasia of prostate	(600)	0.904	1.5	1.5	1.4
Motor vehicle accidents	(E810-E823)	0.974	25.1	23.8	23.2
All other accidents	(E800-E807,E825-E949)	0.884	29.0	28.7	25.4
Suicide	(E950-E959)	0.939	10.5	10.5	9.9

In each instance the reported death rate in column (3) of Table 3 was multiplied by the ratio in column (1) to obtain an estimate of the January-June, 1967, death rate that is most nearly comparable to the death rate for January-June, 1968.

## Summary

The introduction of the Eighth Revision ICDA has produced breaks in mortality trends for many causes of death. These breaks in comparability of data are the result of changes in the classification itself, changes in the international rules for assigning the underlying cause of death, and changes in special procedures and interpretations used by the National Center for Health Statistics in compiling national mortality statistics. The net effect of these changes has been measured through the use of comparability ratios which are computed by dividing the number of deaths assigned to a particular cause or group of causes using the Eighth Revision ICDA, by the number of deaths assigned to the equivalent cause or group of causes using the Seventh Revision ICD. The

denominators of the ratios were obtained from all deaths in 1966 for the United States; the numerators were obtained by recoding, according to the new revision, a stratified random sample of 1966 deaths.

The number of deaths or the death rate for a specified cause of death, derived from deaths occurring during the period the Seventh Revision ICD was in use (1958-1967), can be multiplied by the appropriate comparability ratio to obtain an estimate which is comparable to data derived through the use of the Eighth Revision ICDA. This technique allows review of time trends for specified causes of death without distortion in the trends because of changes in the classification of mortality data.

Comparability ratios for more detailed causes of death by age, color, and sex are in preparation.

(The references may be seen in the original article.)

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American Association for Vital Records and Public Health Statistics, and the Statistics Section of the American Public Health Association at the Ninety-Sixth Annual Meeting in Detroit, Mich., November 14, 1968.

*Editorial Comment: Adoption of the Eighth Revision International Classification of Diseases, Adapted for Use in the United States (ICDA-8), Public Health Service Publication No. 1693 (Volumes 1 and 2), is welcomed by the Navy Medical Department. The ICDA-8 will be used for coding purposes in lieu of Parts I through V of the Department of Defense Disease and Injury Codes NAV-MED P-5082 (DDDIC, which was based on the seventh revision of the International Classification of Diseases).*

*Adoption of the ICDA-8 by the military services is expected to become effective in January 1970. Part VI of the DDDIC, External Causes of Injury, will remain in effect only for specific coding purposes. Current editions of The Standard Nomenclature of Diseases and Operations (SNDO) and Current Medical Terminology (CMT) shall continue to be used for the recording of diseases and operations. Revisions of BuMed Instructions 6310.5 and 6310.8 (for recording and coding morbidity data respectively) will be forthcoming. The change will permit uniform military coding of diseases and injuries consistent with that of all other medical facilities, both federal and civilian.*

## TRICHLOROETHANE POISONING: OBSERVATIONS ON THE PATHOLOGY AND TOXICOLOGY IN SIX FATAL CASES\*

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### Introduction

1, 1, 1-Trichloroethane (methyl chloroform) is a widely used industrial solvent with a low toxicity. Fatal poisoning from this compound is rare; only six human deaths have been reported. Four of these deaths resulted from occupational exposure to high concentrations of 1, 1, 1-trichloroethane in tanks. Hall and Hine reported two cases in which the deaths were attributed to abusive inhalation of this compound. It is the purpose of this presentation to describe the circumstances, the pathologic findings, and the results of the toxicologic analyses in six additional cases of trichloroethane poisoning found among over 1.2 million cases on file at the Armed Forces Institute of Pathology, and to stress the danger of working with this chemical in closed spaces.

### Report of Cases

*Case 1.* A 20-year-old man who had previously been healthy was found dead, lying on the deck in a closed space aboard ship. He had been working with a "paint remover" and had not been observed for an unknown length of time. There was no evidence of trauma.

The autopsy findings were nonspecific. There was no evidence of either natural disease or injury. The lungs were congested and moderately edematous. The

liver, spleen, kidneys, and brain were congested. Microscopic examination confirmed the gross findings. The lungs revealed edema and there were changes suggestive of anoxia in the brain.

The toxicologic analyses excluded the presence of barbiturates, salicylates, and basic compounds in liver tissue, and metals and metalloids in kidney tissue. There were 283 mg lactic acid per 100 gm brain. Gas chromatographic studies revealed the concentrations of 1, 1, 1-trichloroethane in the brain, kidney, liver, and muscle given in Table I. No other volatile substances were detected.

*Case 2.* A 17-year-old man was assigned to clean an air vent in a 6 x 8 x 10-foot room, using 1, 1, 1-trichloroethane. He was observed several times during a four hour period, and he seemed quite well. Three hours and 45 minutes later the compartment was again checked, and he was found dead on the floor.

At autopsy, his skin was moderately cyanotic.

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The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense.

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There was no external evidence of trauma, and the autopsy did not reveal internal injuries. The brain, liver, kidneys, and spleen were moderately congested. The lungs were markedly edematous, and there was evidence of aspiration of gastric contents. There were no other significant findings.

Toxicologic analyses did not reveal ethanol or carbon monoxide in the blood, or basic or acid drugs in the liver tissue. The gray matter of the brain contained 226 mg lactic acid per 100 gm. Gas chromatographic analyses showed the concentrations of 1, 1, 1-trichloroethane given in Table I.

**Case 3.** Aboard a ship an obese but healthy 24-year-old man had been cleaning electrical gear with 1, 1, 1-trichloroethane. He apparently went to bed in his compartment and two hours later he was found dead. Two white rags used to clean the electrical gear were found near his head and had the odor of a volatile aliphatic-chlorinated hydrocarbon.

At necropsy, marked cyanosis of head and neck were noted. The body was that of a markedly obese individual. The heart weighed 550 gm, and the coronary arteries showed slight to moderate coronary atherosclerosis. The lungs were congested and edematous. There was a marked degree of fatty metamorphosis of the liver. The brain, spleen, and kidneys were congested. There was no evidence of injury. Histologic sections of liver showed moderate fatty metamorphosis with a centrilobular distribution.

Toxicologic studies did not reveal the presence of ethanol, carbon monoxide, acidic or basic drugs. The lactic acid concentration in the brain tissue was 126

mg per 100 gm. The concentrations of 1, 1, 1-trichloroethane found are shown in Table I and were determined by gas chromatography.

**Cases 4, 5, and 6.** Four crewmen were assigned to clean electrical equipment with 1, 1, 1-trichloroethane in two closed compartments of a ship. They used a 5-gallon can of 1, 1, 1-trichloroethane, equipped as a sprayer with 14 feet of ¼-inch copper tubing and connected by a rubber hose to an air-pressure valve. Although the men experienced minor effects of the solvent, particularly giddiness, they continued to work. Early in the evening one of the men, who apparently had been unconscious, awoke to discover the bodies of the other crewmen in a small, unventilated 4 x 5-ft compartment.

Autopsies did not reveal evidence of preexisting disease in the subjects. Bullous lesions and focal denudation of skin of buttocks were noted on all three victims. The lungs were congested and edematous. Microscopic examinations confirmed the gross findings and also revealed focal collections of polymorphonuclear leukocytes in the lungs. The histologic sections of skin showed intra-epithelial bullous changes without evidence of the vital reaction.

Toxicologic analyses excluded the presence of barbiturates and salicylates in the blood, liver, brain, and kidney. Gas chromatographic analyses of liver, brain, and blood in these cases did not provide a differentiation between 1, 1, 1-trichloroethane and trichloroethylene, but the quantitative analyses were based on calculations using a trichloroethane standard. The results are given in Table I.

TABLE I.—*Acute 1,1,1-Trichloroethane Intoxication*  
*Results of Toxicologic Examination in Six Fatal Cases*

Body Fluid or Tissue	(Concentration (mg per 100 g or 100 ml))					
	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Blood .....	—	0.15	—	12.0	6.2	6.0
Brain .....	2.7	0.32	9.3	59.0	56.0	50.0
Kidney .....	2.4	0.26	7.8	—	—	—
Liver .....	9.8	0.49	13.2	22.0	11.0	12.0
Muscle .....	4.9	0.26	—	—	—	—
Lung .....	—	0.18	2.2	—	—	—
Urine .....	—	0.1	—	—	—	—

## Discussion

1, 1, 1-Trichloroethane is a colorless, volatile, nonflammable liquid with an odor similar to that of chloroform. It has been promoted as a substitute for carbon tetrachloride because of its low toxicity and is considered to be "one of the safest of the chlorinated aliphatic hydrocarbon solvents." It is used widely in various industries for cleaning metals because it removes oils, waxes, and greases easily.

This compound is rapidly absorbed through the lungs and the gastrointestinal tract, but it may also be absorbed in toxic quantities through intact skin. Exposure to low concentrations of its vapor is usually harmless, and repeated exposures to vapor concentrations of less than 500 ppm have not caused any reported injuries in man.

In the cases reported by Hall and Hine, as well as in the cases presented here, the only significant



finding at autopsy was moderate to marked pulmonary edema. The mechanism for the production of the edema in these cases may be the direct action of the inhaled chemical on the lungs, or the edema may be central in origin. The absence of any significant pathologic changes suggests that death may have occurred rapidly. In three of the six cases, ruptured blisters were found in the skin of the buttocks. These bullous lesions are probably a manifestation of anoxia, akin to that seen in cases of prolonged coma.

Data on the distribution of 1, 1, 1-trichloroethane in fatal human cases are not available. In the two fatal cases described by Hall and Hine, the blood concentrations of 1, 1, 1-trichloroethane were 13 mg per 100 ml and 72 mg per 100 ml, respectively, and these authors indicate that a range of 35 mg per 100 ml to 100 mg per 100 ml could be expected in fatal cases. On the basis of the concentrations in our cases (Table I), we believe that even lower concentrations may be fatal. In all our cases except Case 2, the concentrations in the organs are considered high enough to be fatal. In Case 2, the concentrations of 1, 1, 1-trichloroethane are low. It is likely that this man died mainly from oxygen deprivation, and this explanation is supported by the elevated brain lactic acid concentration. In Case 1, the high concentration of lactic acid in the brain also provides evidence of anoxia. According to Stewart, the concentration of 1, 1, 1-trichloroethane in blood depends on the duration of exposure, the concentration of vapor inhaled, the time elapsed since exposure, the breathing rate of the person during the exposure, and the total concentration of lipid in the blood.

1, 1, 1-Trichloroethane produces the typical effects of an anesthetic agent. The absorption of a toxic quantity results in a functional depression of the central nervous system, leading to death from respiratory arrest or shock. It is also capable of sensitizing the heart muscle in a manner similar to chloroform. Sudden death from ventricular fibrillation may occur in persons exposed to anesthetic concentrations.

Most of the reported deaths from exposure to 1, 1, 1-trichloroethane have been in closed spaces. The dangers of working with this chemical in a closed environment have not been sufficiently publicized. It must be stressed that the knowledge of its low toxicity should not lead to carelessness in dealing with it, and great caution should be exercised while using it in unventilated spaces.

In the practice of forensic pathology, sudden and unexpected death of a young person is a diagnostic challenge. Deaths in closed spaces should arouse the suspicion of the possibility of poisoning by a volatile solvent. A careful circumstantial investigation and appropriate toxicologic study may provide the correct diagnosis in such cases.

#### Summary

Six cases of fatal 1, 1, 1-trichloroethane poisoning are presented, with brief descriptions of the circumstances leading to death, the autopsy findings, and the results of toxicologic analyses.

(The references may be seen in the original article.)

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## MANAGEMENT OF COMBINED INTRACRANIAL INJURIES AND EXTENSIVE ORBITAL-FACIAL FRACTURES

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It was in 1842 that Oliver Wendell Holmes said "there is a dead medical literature and a live one; the dead is not all ancient and the live is not all modern."

It is in this light that a patient with a complicated brain and skull injury associated with orbital and facial fractures is presented, with a discussion of treatment by a combined team approach. The modalities of treatment that will be discussed in this paper include

- (1) the use of carotid angiography in the diagnosis of space occupying traumatic intracranial lesions;
- (2) the administration of glucosteroids (Decadron) for the relief of cerebral edema;

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(3) a discussion of the differentiation of the two types of blowout fractures of the orbit;

(4) a description of a surgical procedure for repair of multiple fractures of the floor of the anterior cranial fossa, utilizing a pneumatic craniotome for the craniotomy; and

(5) implantation of alloplastic material (Silastic) for reconstitution of the orbital floor.

#### Report of a Case

On August 25, 1968, a 21-year-old, right-handed marine was a passenger in an MG sports car, which failed to negotiate a curve and hit a telephone pole at a speed of 40 miles per hour. The patient was not wearing a seat belt and he was thrown violently against the dashboard and rendered immediately unconscious. He was taken to a civilian hospital, where, because of progressive hemiparesis, a left carotid angiogram was performed, which revealed a left temporal epidural hematoma which was evacuated via a left temporal craniectomy on the evening of admission. A reoperation at that hospital on September 5, 1968 was necessary for partial re-accumulation of the epidural hematoma. He was given Decadron, Dilantin and ampicillin postoperatively, and transferred to the Neurosurgical Service at the Naval Hospital, Camp Pendleton, for further treatment.

Positive findings on physical examination revealed a confused, disoriented male, with a healing left temporal scalp incision. There was a moderate right hemiparesis and a palpable four cm skull defect in the left temporal bone, indicating the site of the left temporal craniectomy. He was blind in the left eye and the left pupil was dilated and fixed to light, responding neither directly nor consensually. In addition, there was almost complete left external ophthal-

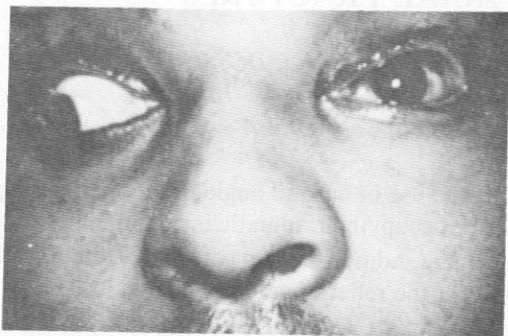


Fig. 1(a). Left internal and external ophthalmoplegia. Left eye is blind, the pupil does not react to light and there is loss of external eye movements. Note weakness of medial motion of the left eye.

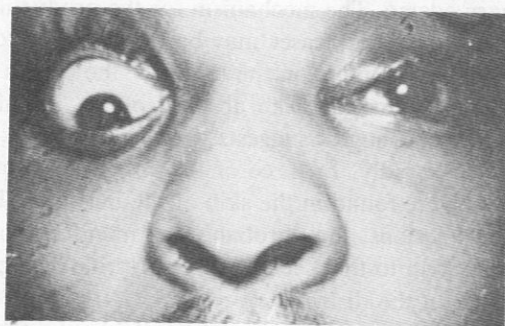


Fig. 1(b). Left external ophthalmoplegia. Note inability of left eye to move inferiorly.

moplegia (Fig. 1), the only extraocular motility remaining in the left eye being lateral motion. There was ptosis of the left palpebrum, with enophthalmus of the left globe. In addition to the right hemiparesis, he was confused and disoriented.

X-rays of the skull revealed a 3 X 3 cm left temporal craniectomy defect. Stereo-Water's X-rays revealed extensive bilateral linear fractures, involving the frontal sinuses and ethmoids (Fig. 2). In addition, there was a large fracture extending into the left superior orbital fissure, and multiple fractures about the left optic foramen, causing rotation of fragments into the left optic foramen. There was a fracture of the left inferior orbital rim in the seven o'clock position. There were multiple fractures involving the nasal bone, the lacrimal bones and the medial wall of the left orbit, specifically the lamina papyracea of the ethmoid bone. The left maxillary sinus was hazy, indicative of blood in the sinus. No mass in the antrum was visualized in the Stereo-Water's views. The patient was able to perceive pain in the left infraorbital area of the left trigeminal nerve. In view of the left enophthalmus and external ophthalmoplegia, loss of inferior, medial and superior motion of the left eye, a blowout fracture of the left orbit was suspected. Tomograms (Fig. 3) in the AP projection confirmed a large, soft-tissue mass projecting down into the left maxillary antrum, measuring 1.3 cms in width and 1.3 cms in height.

*Course.* On 14 September 1968, a lumbar puncture revealed an opening pressure of 160 and a protein of 132 mg percent. On 20 September 1968, via a left frontal osteoplastic craniotomy and utilizing a pneumatic craniotome, the anterior cranial fossa was visualized. Exposure of the optic area was excellent, aided by intravenous mannitol, supplemented by lumbar spinal fluid drainage. Anesthetic hyperventi-

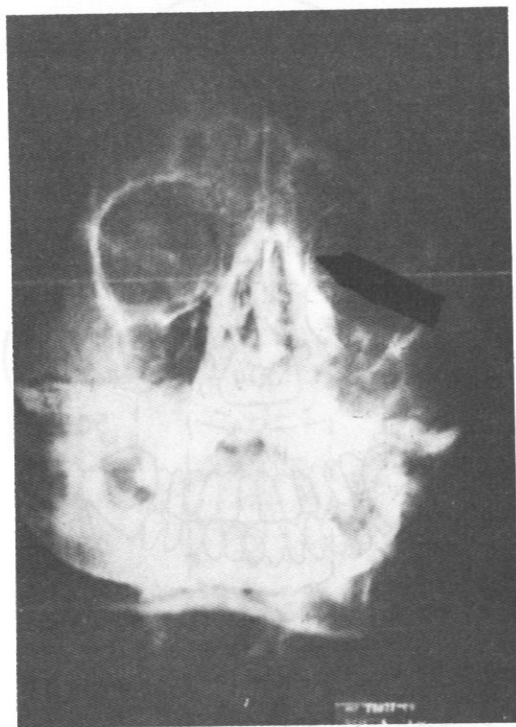


Fig. 2. Water's view showing extensive left frontal, maxillary, ethmoidal and nasal fractures. Note large vertical fracture (arrow) in medial orbital wall, and fracture of inferior orbital rim and extensive frontal sinus fractures.

lation aided the exposure. Upon retraction of the left frontal lobe, it was seen that there were two areas of necrotic brain, enclosed by a glial scar extending into a large defect in the cribriform plate of the ethmoid bone. These prolongations of arachnoid had temporarily plugged the defect in that bone. The liquefied necrotic brain on the orbital surface of the frontal

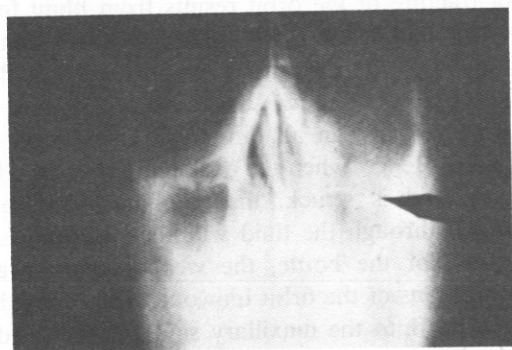


Fig. 3. AP tomogram showing soft tissue density in left maxillary sinus, a "blowdown" fracture of inferior oblique and inferior rectus muscles and periorbital fat into the left maxillary sinus.

lobe was removed by suction. The spicules of bone projecting into the left optic foramen were removed, and the left optic nerve decompressed. The left optic nerve was yellow and contused. The defect in the ethmoid bone in the floor of the anterior cranial fossa was repaired by utilizing a graft of temporalis fascia. The dura was tightly closed and the bone flap wired into place. Attention was then directed to repair of the blowout fracture into the left antrum by the oral surgeons. The left maxillary sinus was opened via a Caldwell-Luc approach, and periorbital fat and inferior rectus muscle were seen to have descended into the antrum. The herniation of these structures, i.e., orbital fat, inferior rectus muscle and inferior oblique muscle was elevated, and the left antrum was packed with iodoform gauze, the end of which was brought out to the Caldwell-Luc opening. Through an infraorbital incision, a silicone rubber (Silastic) implant was positioned under the globe, to reconstitute the floor of the left orbit. Within 24 hours of removal of the liquified and necrotic brain tissue, the patient was alert and responding, rapidly regaining lucidity and orientation. He was ambulatory by the second postoperative day. Extraocular motility in the left eye improved rapidly. All wounds healed *per primam*. The iodoform packing was removed in the second postoperative week.

An electroencephalogram on 9 October 1968 revealed an abnormal EEG, with focal slowing in the left posterior temporal regions, underlying the site of the previous epidural hematoma. It was interesting that no frontal slowing was present. The patient was evaluated by the clinical psychologist on 17 October 1968, at which time the verbal scale IQ on the Weschler adult intelligence scale was 98. His IQ on the performance scale was 95; his full scale IQ was 96. Since then the patient has continued to mentally im-



Fig. 4. Return of conjugate movements of the left eye. Note infraorbital scar at site of implantation of Silastic prosthesis to reform inferior wall of orbit.



prove, and repeat clinical psychological testing revealed full scale IQ to be 115. He has had no headaches nor convulsions. He remains completely blind in the left eye, but, at present, he has had an almost complete return of extraocular motility in the left eye (Fig. 4). He plans to resume college following his discharge from the Marine Corps.

### Discussion

The association of a left temporal epidural hematoma, extensive softening and liquefaction necrosis of the orbital surface of the frontal lobe, extensive fractures of the anterior cranial fossa and extensive fractures of the facial bones associated with a blowout fracture into the left antrum in this patient, presented a surgical problem that is all too commonly seen in this day of high speed automobile accidents, with impaction of the head and face against the dashboard of a vehicle. Accident investigators have reported that 70–80 percent of all deaths and injuries in automobile accidents are from head injuries. Obtaining actual dashboards from cars in which the occupant had incurred skull and facial fractures, Swearingen found that nasal bones were fractured by as little as 30G deceleration forces, mandibular fractures occurred after only 40G, the maxilla by 50G, and pyramidal fractures of the maxilla commonly occurred after 100G deceleration forces (Fig. 5). Although individuals varied in tolerance to fracture forces, there was no correlation between tolerance and age. Obtaining fresh cadaver material and accelerating it against similar dashboards, Swearingen found that the frontal bone in a 66-year-old cadaver fractured with a force of 330G on a 2¼ square inch block, while the frontal bone of a 38-year-old cadaver fractured at 190G on the same area block. Significantly, cadaver skulls impacted into a mold, contoured to fit the face and skull, withstood the highest forces obtainable in the catapult, e.g., over 300G. These large decelerative forces failed to produce either lacerations or fractures when the force of the impact was distributed over the wide area of the mold.

It has been our observation that many late model cars have an extremely thin dashboard cover, concentrating decelerative forces in a very small area, with resultant fractures of the skull and facial bones when the driver or passenger impacts against this thin board (Fig. 6).

Anatomically, the orbital walls consist of relatively thin bone throughout, being protected anteriorly by a ring of strong abutments forming the rim of the

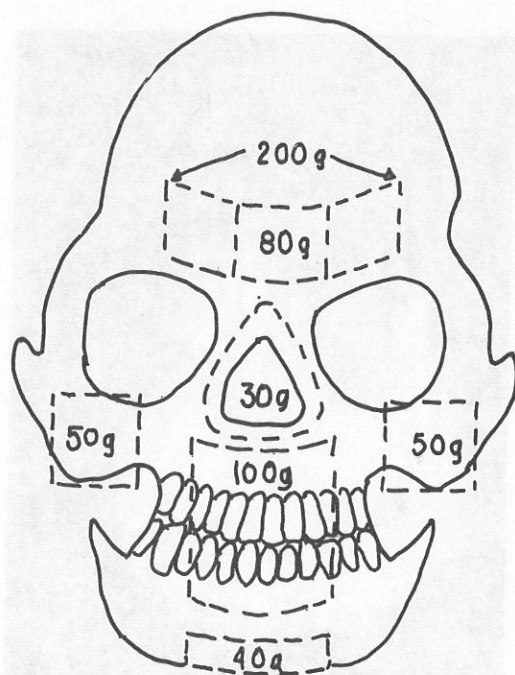


Fig. 5. Deceleration forces required to fracture various areas of the skull and facial bones. From Swearingen, *Tolerances of the Human Face to Crash Impact*.

orbit. The weak areas are in the floor of the orbit, anterior to the inferior orbital fissure, and the paper-thin lamina papyracea of the ethmoid bone, which forms the medial wall of the orbit (Fig. 7). Hence, two types of blowout fractures are commonly seen. The first is the more common blowout fracture of the inferior orbital contents into the maxillary sinus. The second is the fracture of the paper-thin lamina papyracea of the ethmoid bone, with resultant herniation of the medial rectus into the ethmoid sinus. More rarely, superior and lateral orbital blowouts occur. The first type of fracture of the orbit results from blunt force directly applied to the globe, which does not rupture the globe but transmits the force through its fluid contents. By Pascal's law, the forces of pressure are transmitted equally in all directions through an encloser fluid. Hence, when the cork on the top of a full bottle of fluid is struck, the resultant pressure is transmitted through the fluid within the bottle. Like the bottom of the bottle, the weaker inferior and medial portions of the orbit blowout, with herniation of orbital fat into the maxillary sinus, or the medial rectus muscle into the ethmoid sinus (Fig. 8).

The second distinct type of orbital blowout is associated with a much greater force, usually enough to cause a fracture of the orbital rim, and usually found



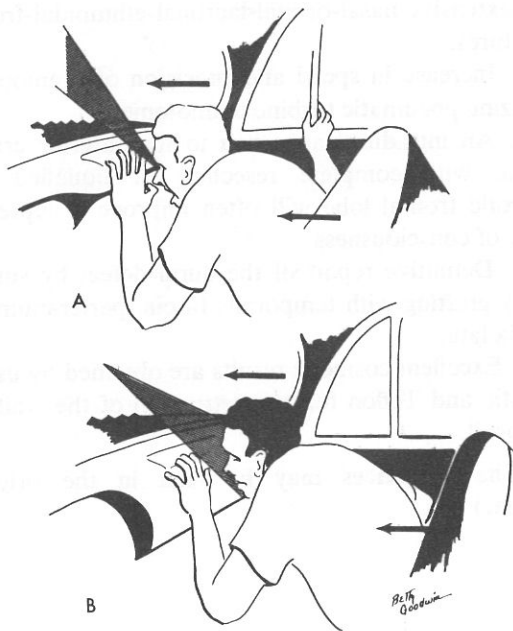


Fig. 6(a). Impaction of passenger into thin dashboard cover, concentrating decelerative forces with resultant skull and facial fractures.

Fig. 6(b). Wider dash cover decreases decelerative forces per square area, preventing skull and facial fractures.

with associated fractures of the nasal, lacrimal and ethmoid bones. These extensive fractures permit portions of the orbital contents, particularly the infraorbital fat, Tenon's capsule, the inferior oblique and the inferior rectus muscle to prolapse into the maxillary sinus, often accompanied by immediate enophthalmus and diplopia. For best functional and cosmetic results early replacement of the herniated fat into the orbital fossa with covering of the opening is necessary.

Previously, autogenous iliac bone grafts have been used to reconstitute the inferior wall of the orbit, but, it is our opinion, based upon a review of 164 cases of malar and lateral orbital fractures treated at the Naval Hospital, Camp Pendleton, from 1962 to 1968, that alloplastic material, e.g., Silastic or Teflon, is the material of choice for orbital reconstitution. The Silastic implants are well tolerated, cause no foreign body reaction, are easily fashioned, require no storage, are autoclavable and readily available.

### Summary

A combined team approach to the management of complex injuries of the brain, skull and facial bones



Fig. 7. Skull with back lightening showing transillumination in medial wall of the orbit, the thin area of ethmoid bone called the lamina papyracea, site of traumatic herniation of orbital contents into the ethmoid sinuses.

is presented. Principles that have evolved in the treatment of similar cases at this hospital in the past six

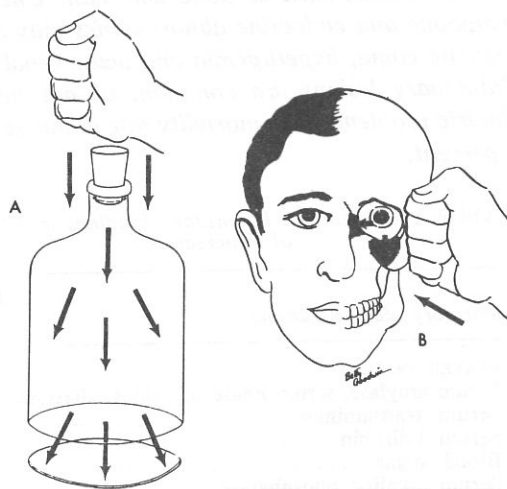


Fig. 8. Transmission of pressure in all directions through a contained fluid (Pascal's Law) results in blowout fractures through thin inferior and medial walls of orbit, similar to when the bottom of a fluid-filled bottle drops out if the cork is sharply hit.

years are described in the case report and can be summarized as follows:

1. Accurate diagnosis and treatment of the neurosurgical problem, utilizing carotid angiography when necessary.

2. Intravenous steroids and mannitol are used in the treatment of postoperative cerebral edema.

3. Recognition of the anatomical sites of blowout fractures of the orbit into the maxillary sinus, the ethmoid wall and rarely into the roof or lateral wall of the orbit is necessary.

4. Differentiation of the two main types of orbital blowout fractures, i.e., simple blowout fractures through the thin bones in the inferior and medial portion of the orbit as contrasted with type 2,

the extensive nasal-orbital-lacrimal-ethmoidal-frontal fractures.

5. Increase in speed and precision of craniotomy, utilizing pneumatic turbine craniotomes.

6. An intradural approach to the anterior cranial fossa, with complete resection of liquefied and necrotic frontal lobe will often improve a depressed state of consciousness.

7. Definitive repair of the dural defect by suture, or by grafting with temporalis fascia, pericranium or fascia lata.

8. Excellent cosmetic results are obtained by use of Silastic and Teflon for reconstruction of the walls of the orbit.

(The references may be seen in the original article.)

## PHYSICIAN AWARENESS OF ACUTE PANCREATITIS

*William M. Lukash, CAPT MC USN, National Naval Medical Center, Bethesda, Maryland. GP 17(2):65-71, August 1969.*

*In 100 patients with pancreatitis, 38 percent had at least one unusual complication or systemic manifestation. An awareness of the variable clinical features in acute pancreatitis will aid in diagnosis and management. Enzymes released in pancreatitis may produce local peripancreatic lesions or may affect remote organs, such as bone and skin. Unexpected metabolic and endocrine abnormalities may result in diabetic coma, hyperlipemia and acute renal failure. Pulmonary lesions are common, as are neuropsychiatric problems. The mortality rate in this series was 5 percent.*

TABLE 1.—Abnormal Laboratory Findings in 100 Cases of Pancreatitis

Laboratory determinations	Percent of cases
ELEVATED VALUES:	
Serum amylase, serum lipase or urinary diastase	84%
Serum transaminase	27%
Serum bilirubin	23%
Blood sugar	21%
Serum alkaline phosphatase	13%
Hyperlipemia	3%
LOW VALUES:	
Serum calcium	3%

The various disorders associated with acute pancreatitis not only may provide the first clues to its

identity but also may confirm an already established diagnosis.

In 100 cases from the clinical records of the naval hospitals at Philadelphia and Bethesda, the primary diagnosis was acute pancreatitis or an acute episode of chronic relapsing pancreatitis. The 82 men and 18 women ranged in age from 17 to 77, with a mean of 40 years. The youngest patient, a 17-year-old girl, had acute cholecystitis and acute pancreatitis.

### Clinical Picture

The diagnosis of pancreatitis was based on a typical clinical pattern of recurrent attacks, characteristic laboratory determinations and suggestive radiographic findings. In 18 cases, the diagnosis was confirmed by surgical exploration or examination at necropsy.

Clinical features typical of pancreatitis are abdominal pain and tenderness, vomiting, fever and occasionally, peripheral vascular shock.

An elevated serum amylase value is the most significant laboratory finding in pancreatitis. Serum bilirubin elevation with clinical transitory jaundice may be present (Table 1). After repeated inflammatory insults or suppuration, chronic pancreatitis—characterized by frank diabetes, steatorrhea and pancreatic calcification—may develop. A localized ileus, the

colon "cut-off sign" or intrapancreatic calcification may be seen on x-ray films.

In our series, alcoholism was the most frequent etiologic factor (Table 2). Biliary tract disease caused 23 percent of the cases.

TABLE 2.—Etiology in 100 Cases of Pancreatitis

Condition	Percent of cases
Alcoholism .....	66%
Gallbladder disease .....	23%
Idiopathic .....	7%
Postoperative .....	2%
Peptic ulcer .....	1%
Mumps .....	1—

TABLE 3.—Complications Due to Local Inflammation

Complication	Percent of cases
Obstructive jaundice .....	10%
With pancreatic pseudocyst (6%)	
With pancreatic phlegmon (3%)	
Abscess .....	9%
Pseudocyst .....	8%
Intestinal obstruction .....	3%
Fistula (primary and secondary) .....	2%
Massive ascites .....	1%
Colonic lesions .....	1%
Panniculitis .....	0%
Splenic rupture .....	0%

Complications

Unsuspected complications that may occur are due to (1) local inflammatory and necrotic effects of pancreatic enzymes on peripancreatic tissues (Table 3) and (2) remote effects of circulating enzymes released from the inflamed pancreas.

Obstructive Jaundice

Obstructive jaundice occurred in 10 of the 23 patients with elevated serum bilirubin levels. In nine patients, biliary tract obstruction resulted from mechanical compression of the intrapancreatic portion of the distal common bile duct (due to pancreatic pseudocyst formation) or from an edematous phlegmon of the pancreas.

Transient mild jaundice occurs in 15 to 30 percent of patients with pancreatitis but it is usually attributed to coexisting hepatobiliary disease or toxic injury from alcoholism. Mechanical obstruction can be caused by progressive fibrosis of the pancreatic tissue, by edema or by a pseudocyst (Figure 1).

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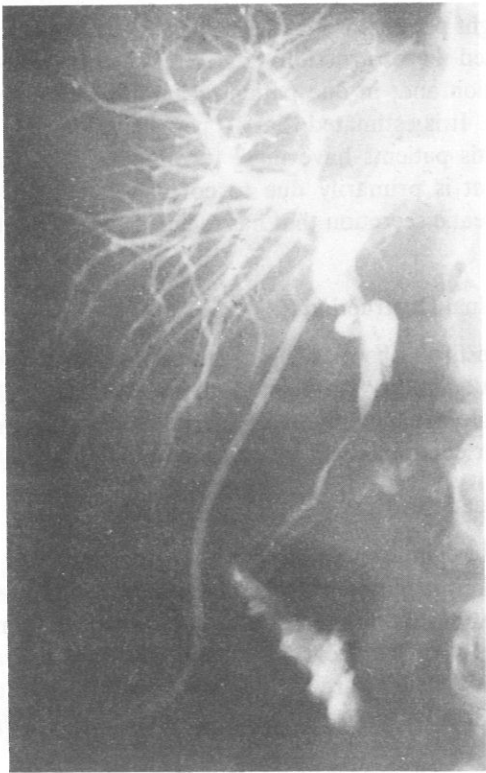
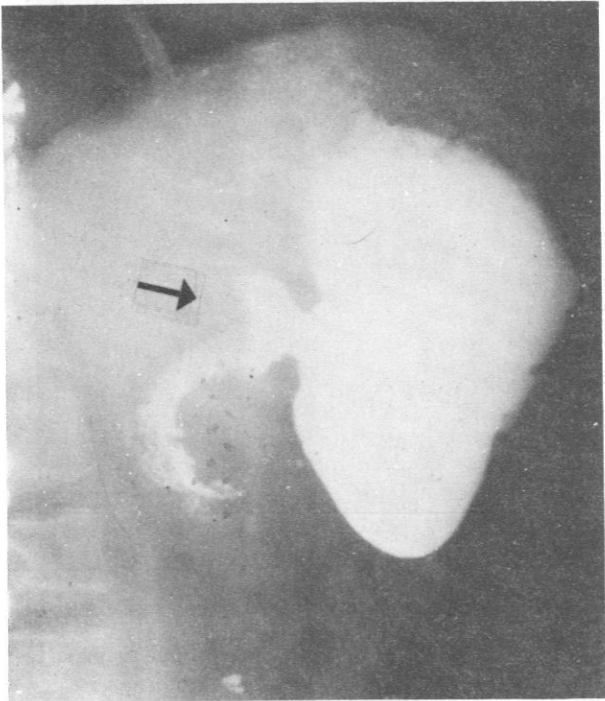


Figure 1. Obstructive jaundice due to pancreatitis. (Above) Postoperative cholangiogram showing attenuation of common bile duct, due to pancreatitis. (Below) Compression defect from a pseudocyst on the superior aspect of the duodenal bulb. It produced common bile duct obstruction and jaundice.





## Pseudocysts

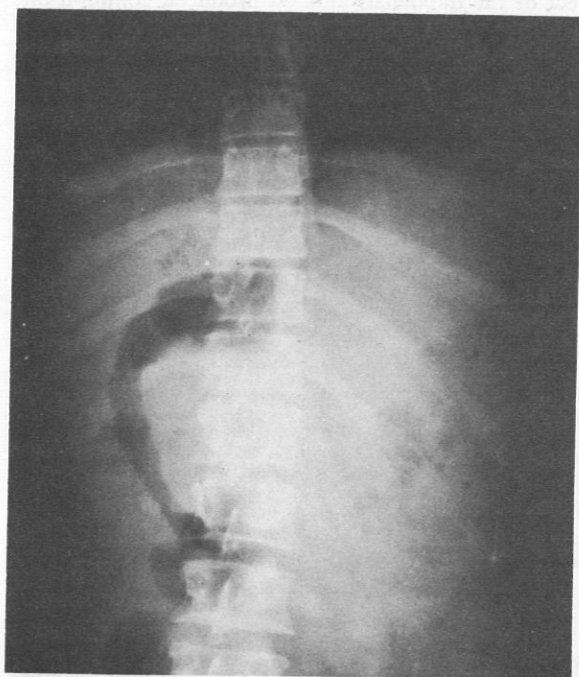
Eight patients in our series had pseudocysts, which resulted in obstruction jaundice, gastric outlet obstruction and, in one patient, a fatal massive hemorrhage. It is estimated that 10 percent of chronic pancreatitis patients have these formations. Their development is primarily due to corrosive action by the pancreatic secretion that has escaped from a ruptured duct.

## Intestinal Obstruction

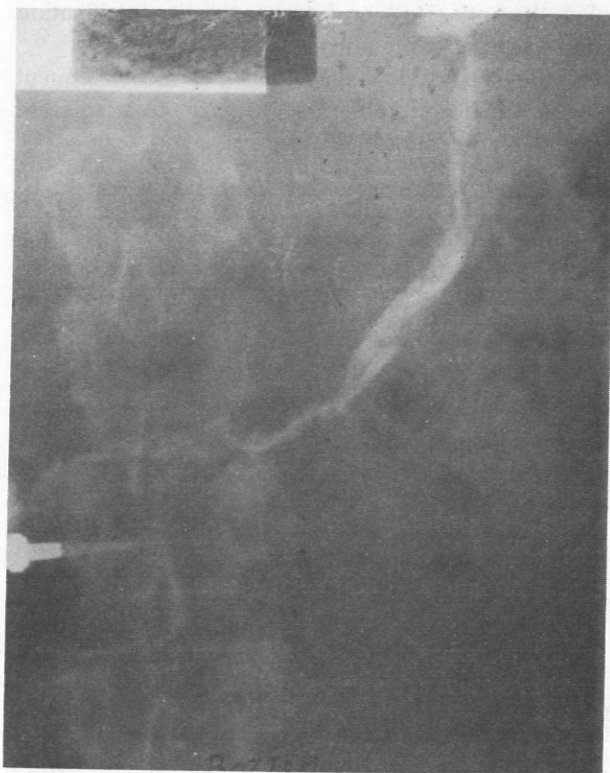
Intestinal obstruction in pancreatitis may involve the duodenum or upper jejunum. The cause is an edematous pancreatic mass, peripancreatic inflammation or encroachment by a pseudocyst (*Figure 2*).

## Pancreatic Fistula

Although spontaneous fistula formation is uncommon, it may develop from rupture of an abscess or a cyst into contiguous structures. Operation on the pancreas or adjacent structures and postoperative surgical drainage are the two most common causes of fistula formation in patients with pancreatitis (*Figure 3*).



*Figure 2.* Sentinel ileus of the duodenum in pancreatitis.



*Figure 3.* Cutaneous fistula from a left subphrenic abscess to the hepatic flexure of the colon. Most fistulas occur after operation on the pancreas or adjacent structures.

## Massive Ascites

In the differential diagnosis of massive ascites of obscure origin, the inflammatory action of activated pancreatic enzymes on blood and peripancreatic tissues should be considered.

## Colonic Lesions

In one of our patients, a lesion developed in the hepatic flexure as a result of acute pancreatitis. Barium enema studies showed mucosal changes and narrowing in the hepatic flexure, simulating ulcerative colitis or carcinoma. The colonic changes were due to a pancreatic inflammatory process which had invaded the mesocolon, causing the collapse of a contiguous localized segment of transverse colon. During active mesocolonic involvement, a plain flat-plate, X-ray film of the abdomen showed gas on both sides of the collapsed colonic segment—the radiodiagnostic "cut-off sign" which was described by Stuart (*Figure 4*).

## Splenic Rupture

Perisplenic adhesions, resulting from acute or re-



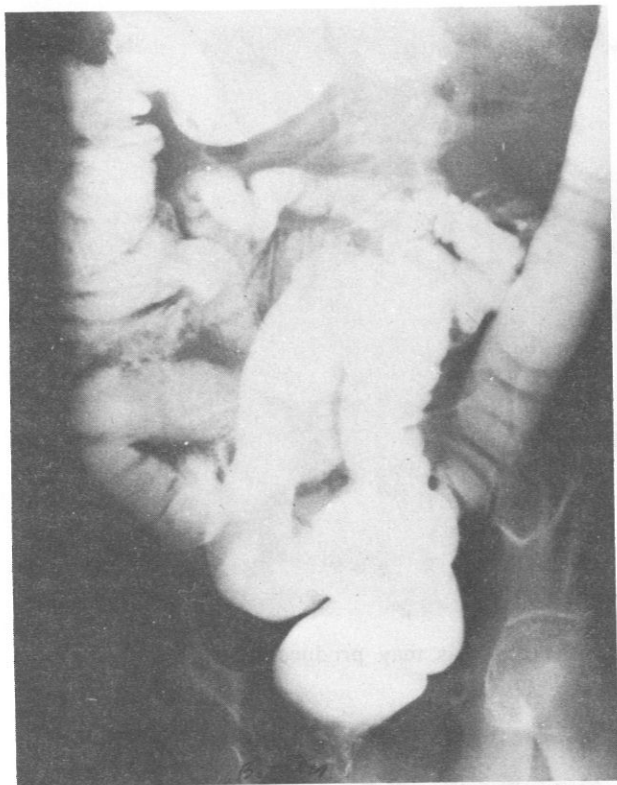


Figure 4. Colonic changes may result from a pancreatic inflammatory process invading the mesocolon and altering a localized segment. (Above) Filling defect in the hepatic flexure, simulating a neoplasm. (Below) Mucosal changes in the hepatic flexure, simulating segmental ulcerative colitis.

current pancreatitis, may cause spontaneous splenic rupture after minimal trauma. Adhesions pulling on the relatively mobile spleen produce a shearing effect and tear the soft, friable splenic tissue.

#### *Complications at Remote Sites*

Fat necrosis may be produced within and outside the pancreas by circulating pancreatic enzymes. It is believed that lipase liberated from the pancreas acts on the fat tissue, hydrolyzing the fat into fatty acids and glycerol. The fatty acids are carried into the lymphatics, where they combine with calcium to produce the insoluble soaps that form the small opaque foci characteristic of fat necrosis (Figure 5). These enzymatic and chemical reactions explain the presence of fat necrosis and the hypocalcemia of acute pancreatitis.

Complications include arthritis, central nervous system fat emboli, lipemia retinalis, osseous changes and pulmonary and subcutaneous nodules.

#### **Skin Lesions**

The subcutaneous nodular fat necrosis which may occur with pancreatitis produces raised erythematous, nodular and usually tender skin lesions, which persist for days to weeks but leave no scars.

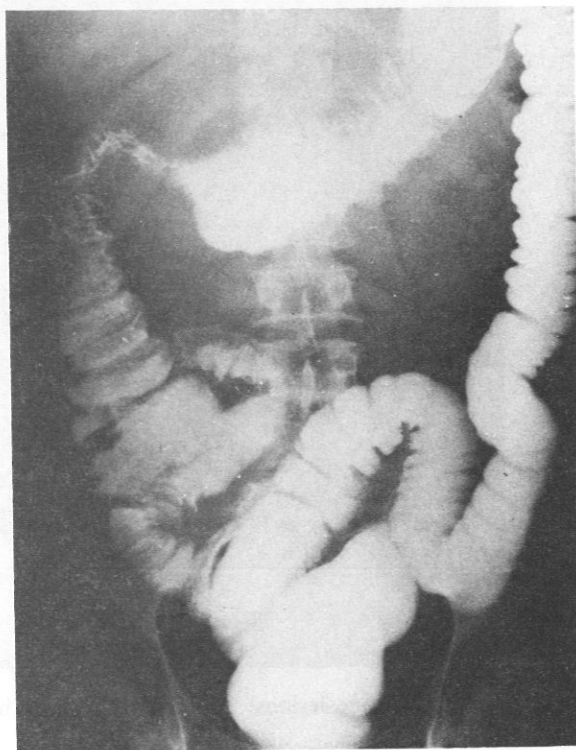
#### **Bone Lesions**

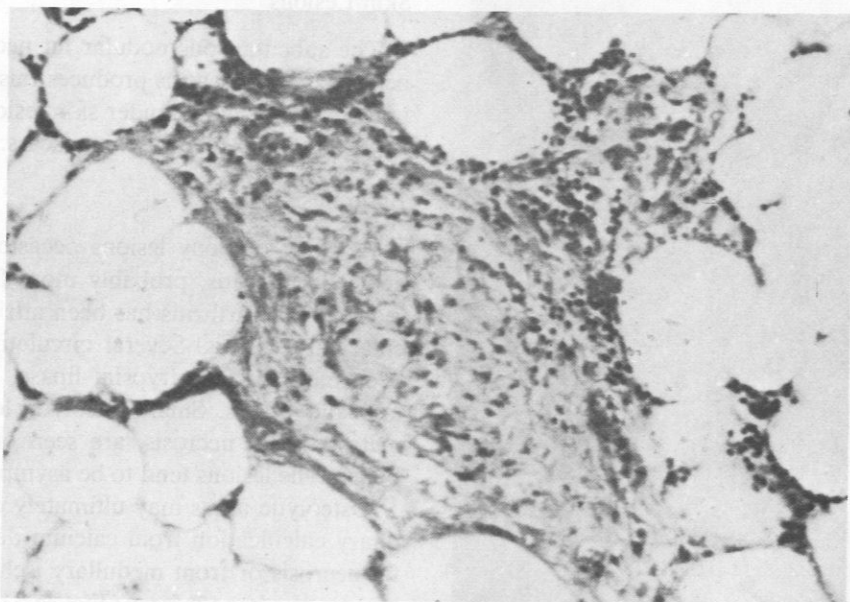
Arthritic or bony lesions occasionally accompany acute pancreatitis, probably more frequently than is realized. The arthritis has been attributed to periarticular fat necrosis. Several circulating enzymes have been incriminated: trypsin, lipase, collagenase, elastase and others. Small osteolytic lesions, caused by metastatic fat necrosis, are seen on X-rays of long bones. The lesions tend to be asymptomatic.

Osteolytic areas may ultimately develop intramedullary calcification from calcium deposits in areas of fat necrosis or from medullary ischemia and the formation of a bone infarct (Figure 6).

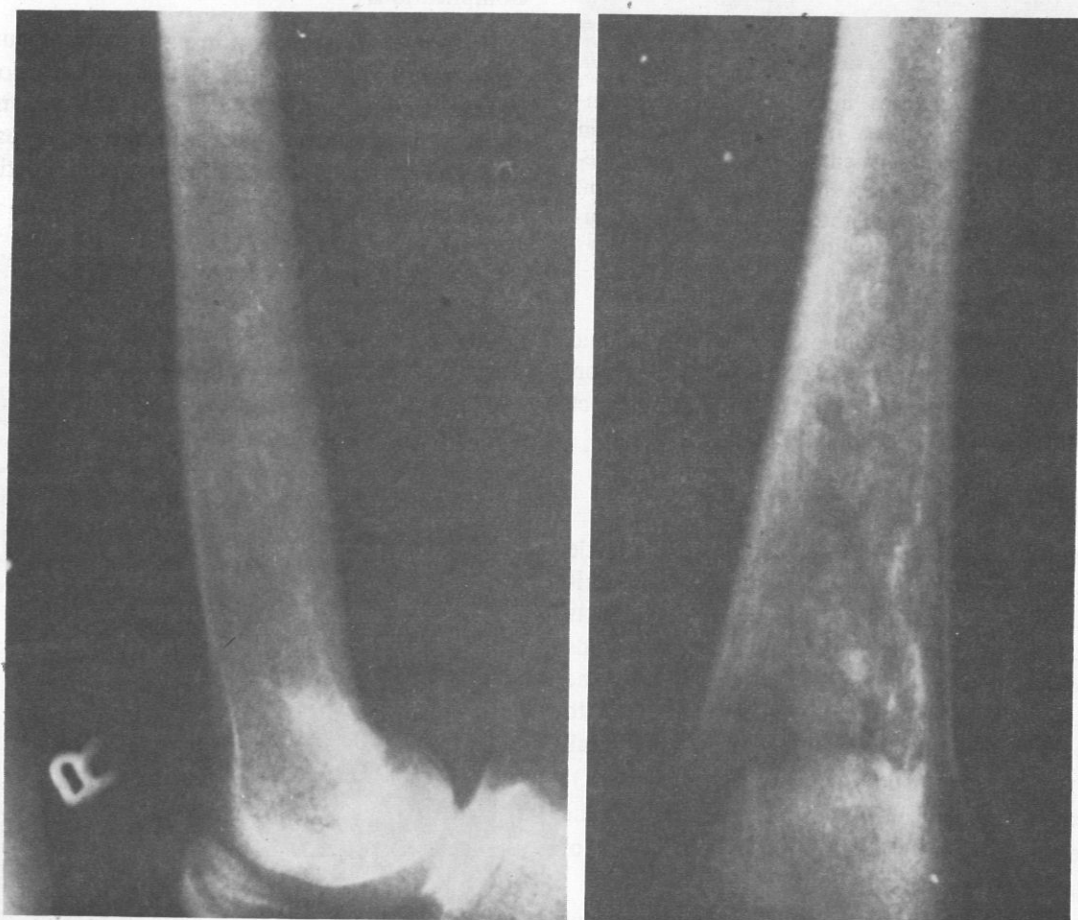
#### **Pulmonary and Pericardial Complications**

Pulmonary involvement in pancreatitis occurred in 15 percent of our 100 patients. Pleural effusion, atelectasis or pneumonitis have been found in as many as 30 percent of patients during an episode of pancreatitis. The most common pulmonary complication is a





*Figure 5.* Circulatory enzymes released by the pancreas may produce subcutaneous nodular fat necrosis.



*Figure 6.* Bone lesions: lytic defect in long bones, due to medullary fat necrosis in pancreatitis.

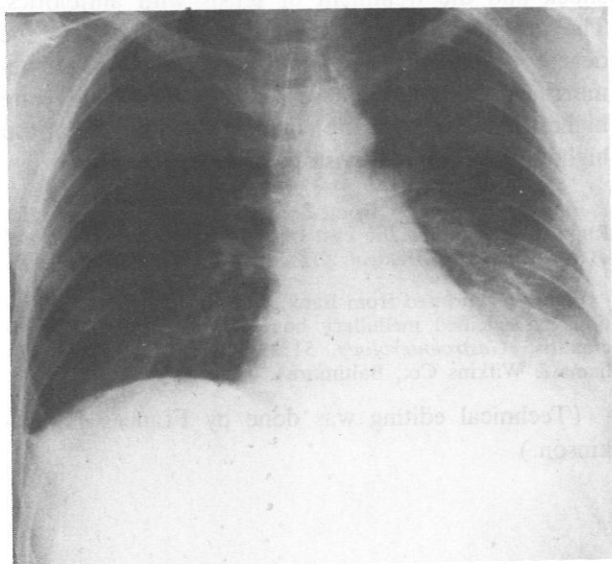


Figure 7. Left basilar effusion due to pancreatitis. This may result from the direct spread of enzyme-rich fluid through diaphragmatic fistulas or by way of lymphatics from the inflamed pancreas.

small left basilar pleural effusion (Figure 7). The fluid may be an exudate or a transudate and occasionally is hemorrhagic. A pericardial effusion can also occur.

#### Endocrinologic and Metabolic Complications

Frank diabetes is known to occur in patients with pancreatitis, especially when they have pancreatic calcification and associated exocrine insufficiency. In a few cases, the patient with acute pancreatitis will first be seen in diabetic coma—a complication of the pancreatitis rather than of the diabetic acidosis. Attendant dehydration and electrolyte imbalance are the result of the pancreatitis.

Pancreatic diabetes may be transient and mild or it may become permanent and increasingly severe, progressing to retinopathy and nephropathy. (Repeated inflammatory insults, with destruction of islet tissue and diminished production of insulin, have been incriminated as the cause.) Keller and his colleagues found that patients with pancreatic diabetes commonly have normal or high levels of serum insulin and insulin activity, which suggests that insulin antagonism may be a factor.

The association of parathyroid disorders with pancreatitis is well known. Calcium and phosphorus dis-

turbances resulting in low serum calcium levels may occur.

Acute renal failure during acute pancreatitis, preceded by prolonged shock, anoxia and hemoconcentration, has a poor prognosis. The dehydration of acute pancreatitis should not be confused with the oliguria of acute renal failure, which is infrequently associated with acute pancreatitis (Table 4).

TABLE 4.—Endocrinologic and Metabolic Complications in 100 Cases of Acute Pancreatitis

Complication	Percent of cases
Diabetes (diabetic coma) . . . . .	13%
Pancreatic calcification . . . . .	12%
Steatorrhea . . . . .	8%
Hypocalcemia and hypercalcemia . . . . .	3%
Hyperlipemia . . . . .	3%
Acute renal failure . . . . .	0%

#### Hemorrhage and Shock

Rupture of an abscess or a pseudocyst into a peritoneal cavity (or into a neighboring viscus) and erosion of adjacent vessels can produce massive gastrointestinal hemorrhage. Ruptured esophageal varices resulting from portal hypertension due to pancreatitis is another hemorrhagic complication. One of our patients died in late shock from a hemorrhagic pseudocyst after the delayed enzymatic erosion of a blood vessel.

Shock in pancreatitis is generally ascribed to marked alterations in the volume of blood and plasma—fluid loss during persistent vomiting, hemorrhage of lesser degrees or large accumulations of exudate within the greater or lesser peritoneal cavities. Fluid loss may amount to several liters a day. Early severe shock from massive hemorrhage or necrosis of the pancreas or peripancreatic tissues can be fatal.

#### Hematologic Complications

Disseminated venous thrombosis and altered blood coagulation are associated with acute pancreatitis. The effect of circulating trypsin on clotting factors may be responsible for this. Hypoprothrombinemia, which is somewhat common, is attributed to impaired liver function. A hemolytic anemia is occasionally seen in acute pancreatitis but it is usually associated with hyperlipemia and jaundice in alcoholics who have fatty cirrhosis of the liver; this may be Zieve's syndrome.

#### Neuropsychiatric Complications

Frank neuropsychiatric manifestations with hallucinations occurred in 6 percent of our patients.



Depression, insomnia, anxiety and narcotic addiction are often associated with pancreatitis and with carcinoma of the pancreas. Alcoholism and the electrolyte disturbances that appear frequently in acute pancreatitis may be responsible for mental changes. Cerebral fat necrosis has also been considered as a possible cause.

#### *Mortality Rate*

The mortality rate in our series was 5 percent. In three patients, death might have been associated with the postoperative state. Death usually follows circulatory collapse, secondary to late hemorrhage, or results from sepsis and fulminating toxemia. The general death rate, which was once 50 percent, is now between 10 and 15 percent. The decrease can be

attributed to more vigorous medical management of shock and the treatment of sepsis with antibiotics. The prognosis and the mortality are related to the degree of pancreatic inflammatory reaction. A hemorrhagic, necrotic pancreas carries a mortality rate higher than that of acute edematous pancreatitis; the highest rate occurs in postoperative pancreatitis.

Figure 5 reprinted from Zeller, M. and Hetz, H. H.: Rupture of a pancreatic cyst into the portal vein. *Journal of the American Medical Association*, 195:869-871, 1965.

Figure 6 reprinted from Bank, S. et al.: Further observations on calcified medullary bone lesions in chronic pancreatitis. *Gastroenterology*, 51:224-231, 1966 (The Williams & Wilkins Co., Baltimore).

(Technical editing was done by Frances H. Atkinson.)

## DRUG ABUSE—EFFECTS AND TREATMENT

### *An Overview\**

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#### *Placebo Effect*

The effect of any drug depends on more than simply the type of drug being used. This is shown to best advantage by the use of the placebo. Shapiro<sup>6</sup> states that the effect of a placebo is enhanced by a great amount of enthusiasm on the part of the physician, by a high level of anxiety in the patient, and by a large amount of ritual associated with the administration of the drug. Secondary gain is another factor which could easily be added to the list. In short, in addition to the drug and the dosage in which it is given, the personality of the user and the environment of the user have an influence on the overall effect. When strobe lights are present and marihuana is smoked in a ritualistic manner, or when discharge from the military service is imminent because of LSD flashbacks, the effects of these drugs are often enhanced.

#### *The LSD Family*

The effects of the LSD family of drugs are already well publicized. LSD, psilocybin, and mescaline manifest crossed tolerance and clinically similar effects. They do not show crossed tolerance with Cannabis sativa derivatives. Williams<sup>8</sup> has described the use of

nutmeg as a psychotropic drug. Nutmeg contains mescaline-like substances, but it often causes the user to feel quite ill. Morning-glory seeds, in addition to LSD-like substances, contain ergot alkaloids and could cause mild symptoms of ergotism. The drug of choice for treatment of an LSD-induced agitated psychosis is chlorpromazine.

#### *Tryptophan Derivatives*

Rubin<sup>3</sup> has described the use of dimethyltryptamine and diethyltryptamine, or DMT and DET as hallucinogens. These are two indole substances derived from tryptophan. They are easy to synthesize, act more quickly than LSD, do not show crossed tolerance with LSD, are inactive when taken by mouth, and can cause athetoid movements.

#### *Methylated Amphetamines*

Another large category of hallucinogens are the methylated amphetamines. There are a large number of these. This and the fact that "street pushers" often substitute one drug for another has led to some con-

\*The opinions or assertions in this paper are those of the authors and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.

fusion regarding the drug known as STP, DOM or 2-5 dimethoxy-4 methyl amphetamine. Snyder, Fallace, and Hollister<sup>6</sup> have corrected two misconceptions regarding this drug. Although it had been reputed to last for 72 hours, in none of their subjects did the effect of the drug last for two days. Although chlorpromazine is said to increase the effects, simultaneous oral doses of 200 mg of chlorpromazine and 10-14 mg of DOM yielded a decrease in the hallucinogenic effects of DOM. This group of drugs acts like an amphetamine when a low dose is given, like an hallucinogen with a medium dose, and like a convulsant with a very high dose.

### Amphetamines

The amphetamines can produce a paranoid psychosis and malnutrition. When the use of amphetamines is stopped there is often a depression. Amphetamine users frequently use barbiturates or sedative-hypnotics to help them "come down." There is some controversy regarding the use of phenothiazines for amphetamine overdose and barbiturates are probably the drug of choice.

### Belladonna Alkaloids

Belladonna alkaloids are commonly found in "over the counter" medications such as Sominex, Asthmador, and medications for the common cold. Overdosage will cause a delirium. The flushed face and dilated pupils usually make the clinical picture easy to recognize. The "street pusher" frequently adds belladonna alkaloids to his drugs. Because chlorpromazine has atropine-like effects, it makes the clinical picture worse. Mecholyl and most cholinergic drugs act only peripherally and therefore are of little use in the treatment of an overdose. It is possible that a centrally acting cholinergic such as eserine could help, but its use has not been clinically proven. In any case, the patient almost always recovers, even after the ingestion of very large amounts of atropine-like compounds. Asthmador also contains potassium nitrate, and the ingestion of extremely large amounts could cause potassium poisoning. This can be assessed with an EKG.

### Sernyl and Ditrán

Sernyl is a drug which is intended to be used in veterinarian medicine as an anesthetic. It produces a very unpleasant psychotic experience. Nevertheless it has been used as an hallucinogen. It is sometimes referred to as the "peace pill." Ditrán produces a similar picture with some atropine-like side effects.

### Cannabis Sativa

Cannabis sativa derivatives are currently in question. Although Scheckel<sup>4</sup> found that an extremely large dose of tetrahydrocannabinol or THC can kill a monkey. Weil<sup>7</sup> and others have been unable to attribute any dramatic effects to the use of marijuana in a clinical setting. It is especially with marijuana that the environment and personality of the user seem to influence the effects of the drug. Pure THC is a sticky resin which is extremely difficult to synthesize. The presence of abundant quantities of so-called THC pills on the drug market is proof positive that the drug buyer is often duped.

### Opiates and Sedative Hypnotics

The effects of opiate usage have been well documented. The opiates do not show crossed tolerance with the sedative-hypnotics such as the barbiturates, alcohol, Doriden, paraldehyde, etc. Heroin withdrawal, unlike withdrawal from the sedative-hypnotics, rarely causes convulsions and death. Adolescents commonly ingest large amounts of cough syrups containing codeine. In the prevention of convulsions during withdrawal from sedative-hypnotics, barbiturates and the chlordiazepoxide-diazepam drugs are more effective than the phenothiazines. As a general rule, the daily dose has to be at least four times greater than the therapeutic dose to produce very slight withdrawal symptoms. A daily dose which is eight times the therapeutic dose may cause moderate withdrawal symptoms. It is best to withdraw a patient by titrating with the drug employed. A practical point for the emergency room physician is that barbiturates are often designated by colorful names, e.g., blues, reds, yellows and rainbows.

### Miscellaneous

Other drugs which have been used recently will be listed in a somewhat telegraphic manner. Winek<sup>9</sup> has described a fatality resulting from glue sniffing. Death is usually due to respiratory arrest. Toluene can cause liver and kidney degeneration, microcytic anemias and peripheral neuropathies. Because toluene can sensitize the myocardium, epinephrine is to be avoided when treating glue sniffers. Carbon tetrachloride causes liver and kidney damage. Benzene can produce a leukopenia in addition to most of the problems associated with toluene. Gasoline sniffing can lead to lead encephalopathy. When an extreme overdose of fluorinated hydrocarbons is administered, e.g., when a can of Can-O-Frost is sprayed directly in the trachea, death results probably via ventricular

fibrillation. Nitrous oxide was recently incriminated in two reported deaths in California. Lidocaine has been injected intravenously to produce some sort of psychic experience. Its convulsant properties in this situation are well known. Strychnine is commonly added to "street hallucinogens." Jackson and Reed<sup>1</sup> have interviewed catnip smokers who state that its effects are milder than those of marihuana. Koch<sup>2</sup> has described renal papillary necrosis in conjunction with the abuse of APC tablets. Some adolescents have been inhaling amyl nitrite just prior to orgasm to enhance the pleasures of sexual intercourse. Marked overdosage of amyl nitrite can cause methemoglobinemia. Smoke from burning ping-pong balls is being inhaled and allegedly old adrenalin and peanut butter are being injected intravenously. I have been unable to substantiate the injection of peanut butter however.

### Therapy

Because of the use of many relatively new and unknown substances and because of the uncertain content of street drugs, the best emergency therapy is simply to provide support for the respiratory and circulatory systems. In the past, the results of long term therapy have usually been disappointing. The present impact of this problem is stimulating the invention of many new approaches. The effects of methadon therapy are being evaluated. Groups of converted drug users are trying to help the neophytes with their problem. Some workers are interested in a behavioral approach, some hope to develop chemical blockers, and others are attempting to alleviate this problem via social reform. Although ubiquitous, drug abuse is a problem which is difficult to define even as a syndrome and concepts concerning its etiology are many. Consequently, it will be necessary to utilize many energetic and diversified approaches to achieve substantial therapeutic success.

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*The following comments and discussion were contributed by CAPT Jay D. Wilson, Head of the Neuropsychiatry Branch of the Professional Division at the Bureau of Medicine and Surgery.*

Dr. Pasternak's article is informative and timely. In this age of prominently harsh reality, of marked anxiety about the future, in this era of destructive permissiveness and outright rebellion against authority, there are those individuals who can accept, adjust to, and work within the situation. There are those to whom reality is uncomfortable or intolerable. These latter take various roads to escape for varying periods of time. One of the most dangerous means of escape is the use of various substances for the purpose of inducing the *DELUSION* of vastly increased powers, the *ILLUSION* of well-being.

Over the past five years, the mass media have extensively publicized marijuana, LSD, and other dangerous and illicitly possessed drugs and have devoted considerable space to the personalities and opinions of individuals who advocate use of these drugs as a panacea for most problems of living. Directly attributable to the widespread publicity, coupled with actual misinformation or lack of definitive knowledge of the effects of the dangerous drugs, their use by young adults in the United States has increased at an alarming rate. As has been anticipated, a comparable increase in drug abuse has been encountered among the young adults in military service.

To emphasize widespread measures undertaken to reverse this trend, attention is invited to DoD Directive 1300.11-CH1 of February 2, 1968, Navy Regulations Article 1270, SECNAV Instructions and BUPERS Notices of the 6710 series. The important references specify official policy concerning drug abuse. Each Naval medical officer is bound by this policy, regardless of personal philosophy in the area.

"It is the policy of the Department of Defense to prevent and eliminate drug abuse within the armed forces. The illegal or improper use of drugs by a member of the armed forces may have a seriously damaging effect on his health and mind, may jeopardize his safety and the safety of his fellows, may lead to criminal prosecution and to discharge under other than honorable conditions and is altogether incompatible with military service or subsequent civilian pursuits. The Department acknowledges a



particular responsibility for counseling and protecting members of the armed forces against drug abuse, and for disciplining members who use or promote the use of drugs in an illegal or improper manner."

SECNAV Instruction 6710.1A of 11 July 1969 directs all commanding officers to institute and conduct a rigorous program to counteract illegal

experimentation with dangerous drugs. This ongoing program includes regular educational activities as well as the taking of necessary steps to prevent trafficking in illicit and dangerous drugs. The instruction contains basic information and describes the many training aids (films and printed matter) available for educational campaigns.

## The Gastroenterologist Corner

*A two year fellowship program in the subspecialty of Gastroenterology has been in continuous operation since 1963 at the Naval Hospital Philadelphia. At present, this program provides the desirable balance of a variety of clinical material and endoscopic procedures combined with active clinical research on gastrointestinal diseases. The support for this program comes mainly from two full-time qualified Gastroenterologists, and is sponsored by CAPT Frank Brooks, MC, USNR-R, a nationally prominent gastroenterologist and Director of Gastroenterology training at the University of Pennsylvania.*

*CDR Erwin L. Burke, MC, USN, himself a graduate of the Fellowship at Philadelphia, is current director of the program. Dr. Burke is an able and enthusiastic teacher who combines exceptional skill in endoscopy with an active interest in clinical investigation, particularly in the field of gastric secretion.*

*CDR Donald O. Castell, MC, USN, has recently joined this group after two years of Research Fellowship in Gastroenterology at Tufts University in Boston. His primary clinical and research interests are in the fields of liver disease and abnormalities of gastrointestinal motility.*

*In addition, a third staff Gastroenterologist, LCDR Stephen M. Levine, MC, USNR, is currently assigned to this hospital. Dr. Levine received his GI training at Yale and has a broad background in clinical gastroenterology.*

*Regular informal seminars on various aspects of GI disease are presented by the staff to the GI Fellows and house officers. Those topics which should be of interest to Navy Medical Officers in general are being selected to constitute a series of monographs in the Newsletter. The following paper represents the first in this series.*

### THE USE AND ABUSE OF ANTICHOLINERGIC DRUGS IN ACID PEPTIC DISEASE

*CDR Erwin L. Burke, MC, USN, Gastroenterology Branch,  
Medical Service, Naval Hospital Philadelphia.*

#### Introduction

Anticholinergic agents are widely used in the treatment of peptic ulcer and other dyspeptic states. Despite extensive use there is considerable controversy about their effectiveness, and a notable lack of uniformity in methods and duration of administration. Many clinicians are not systematic in the use of anticholinergics and apparently are not convinced of their efficacy, however, studies<sup>1,2,3</sup> have shown that statistically significant benefit is derived from their long term use. It is the contention of the author that the proper administration of anticholinergic agents in

correct dosage in selected clinical situations is of definite value.

*The Relationship of Gastric Hydrochloric Acid Production to Peptic Ulcer.*—The expression, peptic ulcer, correctly implies that the process is one of peptic digestion and not an effect of acid itself. The primary gastric digestive enzyme group, the pepsins, are most active only in a very acid medium. However, in any event, it is clear from a clinical standpoint, that a definite relationship between acid pro-

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The opinions expressed herein are those of the authors and cannot be construed as reflecting the views of the Navy Department or of the Naval Service at large.

duction and the occurrence of ulcer exists. Furthermore, hypersecretory states with dyspeptic symptoms and without ulcer are probably not uncommon.<sup>4,5</sup>

*The Physiology of Gastric Acid Secretion.*—Hydrochloric acid is produced by the parietal cells located in the body of the stomach. This phenomenon occurs in response to an interrelated complex of hormonal, neural and mechanical factors. The parietal cells receive direct stimulation from parasympathetic innervation to produce acid.<sup>6</sup> In addition, parietal cells respond to the hormone gastrin by producing acid, this response being facilitated by vagal innervation. The hormone gastrin, in return, is released from the gastric antrum in response to direct vagal stimulation and in response to certain mechanical and chemical factors. These factors include foods, particularly proteins, alkalis, and mechanical distention or distortion of the antrum. These latter responses are again facilitated by vagal innervation. The situation is made even more complex by intestinal factors. For example, acidification of the duodenum causes an inhibitory influence while massive small bowel resection or disease can result in marked gastric hypersecretion.<sup>7</sup>

*Pharmacology and Rationale of Anticholinergic Drugs.*—It is obvious that the parasympathetic, i.e. cholinergic system weaves a complex web about all the other stimulatory factors. In addition, vagal stimulation is the most powerful stimulus for pepsinogen secretion in man and can induce more than ten times the highest rate of secretion obtainable with gastrin.<sup>8</sup> Attack upon the parasympathetic system by surgery or drugs could obviously be expected to significantly decrease gastric acid secretion, and such is indeed the case. The drug actions apparently are not so simple in that, in addition to the gastrointestinal antisecretory effect, there is a prominent antimotility effect. Both effects are manifest in many organ systems. The eyes, bladder emptying, stomach emptying and the cardiovascular system are particularly affected. The ideal agent then would be one which exerted a high local antisecretory effect with a low motility effect locally and systemically. The necessity for a reasonably long duration of action and a low incidence of allergic side effects is obvious. The great plethora of anticholinergic drugs and drug combinations indicates that the ideal agent does not exist. Many clinicians feel that the ratio of antisecretory to antimotility effect varies with different drugs, but scientific proof is not readily available. The undesirable effects of impaired gastric motility were demonstrated in an unusual way by Dragsted.<sup>9</sup> Recognizing the role of the vagus in the production of duodenal ulcer disease

he introduced vagotomy in its treatment. A significant proportion of his patients then developed chronic gastric ulcer, apparently on the basis of the production of gastrin by the flaccid and distended gastric antrum. Currently this situation is obviated by the performance of a drainage procedure with vagotomy. This same undesirable effect can at times result from, or be rendered more likely by, inappropriate anticholinergic therapy.

*Selection and Use of the Anticholinergic Agent.*—Regardless of the agent selected it is important to administer the drug systematically in divided doses and in sufficient amounts. The common use of the terms tid and qid results in inadequate coverage of the 24 hour period. A more acceptable manner would be "x" mg tid ½ hour ac and at hs. The basic dose should be a small one with periodic increases until the maximum dose is indicated by the development of dry mouth and/or blurred vision.

The list of drugs given below does not represent an attempt to discuss the wide range of drugs but simply a small number on the basis of popularity or those having impressed the author as promising.

1. Tincture belladonna (atropine). This preparation is administered as drops of liquid tincture. It is one of the oldest anticholinergic drugs, being used by ancient Egyptian beauties for the cosmetic effect of mydriasis. It is still favored by many clinicians in the treatment of acid peptic disease.<sup>10</sup> The dose is titrated to each individual by increasing the number of drops until the desired effect is reached. There are two main objections to its use. (a) It is difficult to ensure that medical assistants or the patient laboriously count out the required number of drops several times per day. (b) The duration of action of an effective dose, when achieved, is rarely more than 15–30 minutes.<sup>1</sup>

2. Probanthine (propantheline bromide). Probanthine enjoys wide popularity, but is most often given in an inadequate stereotyped dose of 15 mg qid. The author no longer prescribes this drug because of the high incidence of side effects, particularly delayed bladder emptying and delayed gastric emptying. The striking antimotility effects are illustrated by use of probanthine to "paralyze" the duodenum for hypotonic duodenography and occasionally to arrest gastric peristalsis at gastroscopy.

3. Nacton (poldine methylsulfate), Robinul (glycopyrrolate), and Daricon (oxyphephenacyclimine HCl). These newer drugs impress this author as having an effective antisecretory effect, a reasonable duration of action, and a low incidence of side effects. Reports in the literature would indicate

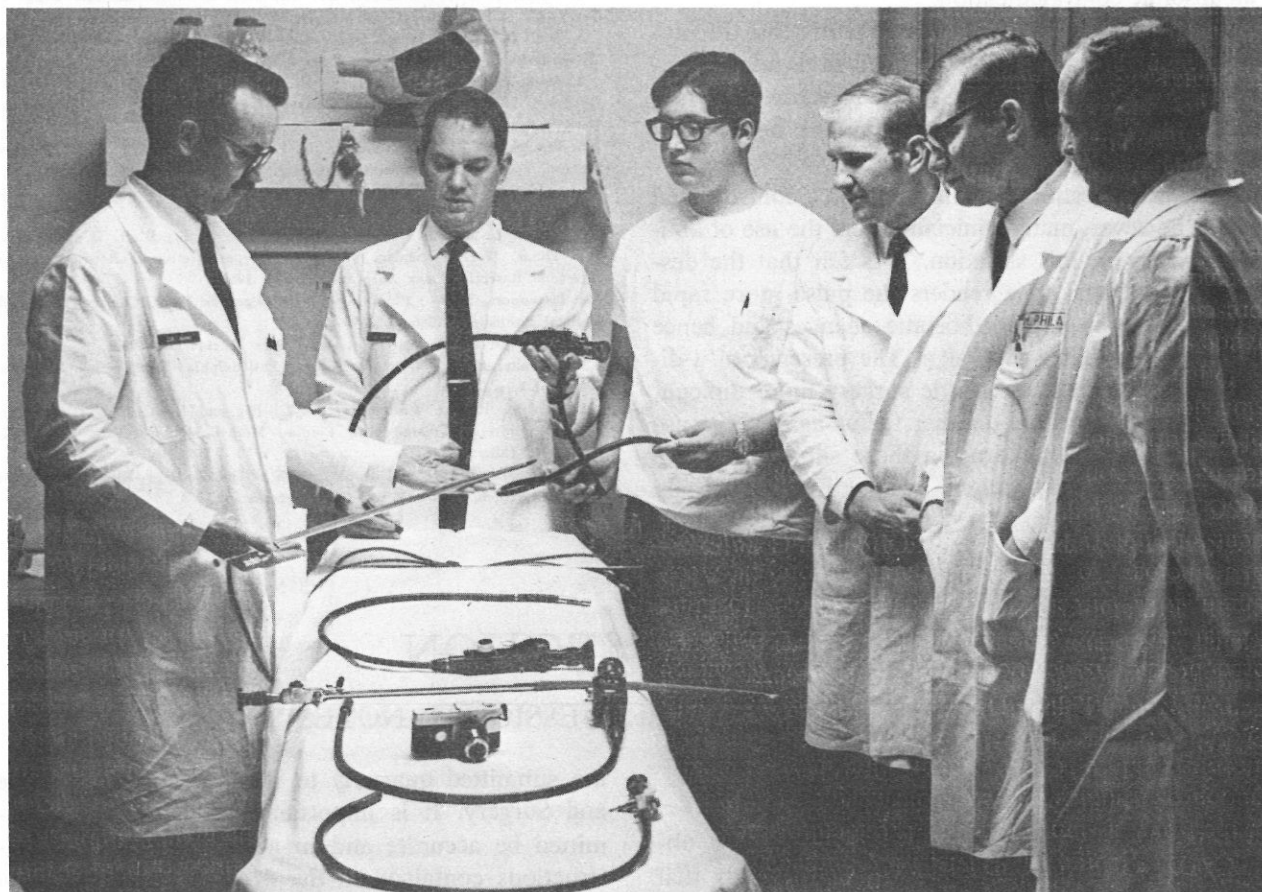
that Nacton is particularly effective while Daricon is to be noted for its more prolonged action. Nacton and other newer anticholinergic agents have been used in the control of the Zollinger-Ellison Syndrome<sup>11,12</sup>. The usual starting dose is 4 mg four times daily for Nacton and 10 mg twice daily for Daricon. Robinul seems to share the properties of Nacton, perhaps with less recognition in the literature. In the author's experience advanced age, or stable cardiovascular disease have not posed a contraindication to its use. Urinary retention or recognizable gastric retention are quite uncommon and no cases of serious eye problems have been encountered. Despite the low incidence of serious side effects with this drug, it is an anticholinergic drug demanding respectful administration by an informed physician. Therapy with Robinul is begun as a 4 mg per day dose ordered as Robinul 1 mg tid ½ hr ac and at hs. Approximately every two days the dose is increased until side effects intervene. The usual maximal dose varies from 8 to 16 mg per day. Over a period of several months of treatment with Robinul the performance of periodic augmented histalog gastric analyses have dem-

onstrated definite lowering of the maximal acid output, usually to about one-half of pretreatment levels.

How long to continue therapy is again a matter not clearly settled. At Naval Hospital Philadelphia, where gastric hypersecretion is of particular interest, cases of hypersecretion are treated for about one year. In cases controlled by Robinul and with recrudescence after withdrawal of the drug, we would not hesitate to use the drug indefinitely. The duration of the lowered acid secretion after cessation of therapy cannot be predicted in the individual case, but the possibility of long continued lowering of acid secretion after the use of anticholinergics exists.

*Situations where Some Degree of Contraindication of Anticholinergics Exists.—*

1. Duodenal ulcer disease with extensive scarring and consequent delayed gastric emptying. Any decrease in motility by anticholinergic drug administration would further aggravate the degree of retention and activate the gastrin mechanism.
2. Pyloric channel ulcer. Some degree of retention





is expected in this situation and the same results as in No. 1 could be expected.

3. Gastric ulcer. The isolated gastric ulcer is often associated with a normal or low level of gastric acid and it would seem that the cholinergic mechanism plays a less important part than in the case of the duodenal ulcer. In those situations where gastric ulcer follows duodenal ulcer there is often duodenal scarring and the same reasoning as in No. 1 again applies. In those special instances where gastric ulcer is associated with hypersecretion and no evidence of gastric outlet obstruction exists, a cautious trial of anticholinergics might be in order. In this event frequent checks to detect any delay in gastric emptying are in order.

4. Hiatal hernia. Many experienced clinicians avoid the use of anticholinergics in this condition as any delay in emptying might increase reflux.

5. Glaucoma. The presence of glaucoma is usually regarded as an absolute contraindication.

6. Arteriosclerotic heart disease. Many regard this situation as a contraindication. The author has used Robinul with caution in the more stable cases with efficacy and safety, and hence does not regard the presence of arteriosclerotic heart disease, per se, as an absolute contraindication.

7. Prostatism and prostatic hypertrophy. Prostatism can be aggravated by the injudicious administration of an anticholinergic. In the absence of symptoms due to prostatic enlargement, the newer anticholinergics can be used with caution.

8. Gastrointestinal bleeding. This is a controversial point, however, many clinicians avoid the use of anticholinergics in this situation. It is felt that the destruction of vagal tone renders the pulse more rapid and more subject to orthostatic changes and hence destroys a valuable vital sign. The presence of a dilated stomach renders gastric surgery more difficult. This would constitute another factor against the use of an anticholinergic drug in those situations where emergency surgery might result. The effect on

bleeding is unclear, but many feel that anticholinergic drugs can aggravate or precipitate further bleeding.

9. Confined perforation. The author has never seen such an instance, but it is commonly said that anticholinergics can mask the development of a confined perforation. It might be well to keep this possibility in mind, but in general it is not felt to be a contraindication to such therapy.

### Summary

The rationale for the use of anticholinergics has been reviewed. A number of anticholinergic agents are discussed. The agents Nacton, Robinul, and Daricon are felt to be among the most promising of the anticholinergic agents. The emphasis upon Robinul results only from the author's long familiarity with this drug and no advantage over the newer anticholinergics is implied. Probanthine, in the author's opinion, has a high relative antimotility effect and does not deserve its seeming popularity in the treatment of acid-peptic disease states.

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## DENTAL SECTION

### PERSONNEL AND PROFESSIONAL NOTES

#### DENTAL SERVICE REPORT DD-477

Compilation of Navy worldwide statistics is obtained from individual Dental Service Reports that

are submitted quarterly to the Bureau of Medicine and Surgery. It is important that the reports submitted be accurate and in accordance with the instructions contained in the *Manual of the Medical*

*Department.* Manuals and changes are addressed to the commanding officer who is responsible for proper assignment of copies in accordance with NAVREG, art. 1607.3 and BUMEDINST 5215.4 series. Requirements for manuals and changes should be made known to the commanding officer.

The *Manual of the Medical Department*, Chapter 6-150, Change 49, should be reviewed prior to preparing and submitting Dental Service Reports. The most frequent errors are due to oversights and/or neglect to consult the appropriate instructions in the manual.

The most common errors are:

a. The Electric Accounting Machine (EAM) number is either omitted, incomplete, or improperly spaced. This number should be exactly as assigned by BUMED. The number identifies the individual activity and is essential for computation of the report by Data Processing Division.

b. Part 1, lines 16, 21, 33, 43, and 49 should each have the word "MISCELLANEOUS" typed in regardless of whether they are used or not. These lines are to be used for procedures which are not described in the printed categories. This omission is one of the most frequent discrepancies.

c. Part 1, lines 8, 34, 35, and 36 should be left blank. The computer is not programmed for entries on these lines. Any procedures recorded will not be credited.

d. Part II is still being completed by many activities. This information is not required.

e. Part III, Military Strength Served, a very important section, is often left blank or does not accurately show different types of personnel served.

"Number classified" in this section should be left blank. It is no longer required.

f. In Part IV, many activities do not adhere to the new format required by Chapter 6, Change 49. Errors in this section include inaccuracy in reporting total dental officer workdays, total dental officer days worked, average number of personnel attached, and categories of personnel on board. Always use the examples cited in Change 49, or succeeding changes, to compute these numbers. To save processing time in BUMED, always use the nearest whole number. Fractions have to be changed to whole numbers before the report goes to Data Processing. Always include the "Copy to" with complete address in the proper place.

Attention is invited to the fact that the Dental Service Report is to be mailed to the Bureau of Medicine and Surgery by the tenth calendar day of the month following the quarter being reported. Delinquent and incorrect reports delay compilation of the required information and necessitate additional correspondence.

#### DISPOSITION OF RECOVERED SILVER

BUMEDINST 4010.1C promulgates policy and procedures for the establishment of an effective silver recovery program within activities under the command of BUMED.

The directive states, in part, that programs should be established to recover silver from X-ray developing solutions, outdated and exposed X-ray film, dental scrap, and other silver-bearing scrap. Instructions for proper reporting, packing and shipping are also set forth in the directive.

### PROFESSIONAL RELATIONS PROGRAM

#### CDR HARDIN KEYNOTE SPEAKER

CDR Jefferson F. Hardin, DC, USN, was the keynote speaker at the annual meeting of The Georgia Dental Association, held 5-8 October 1969, in Atlanta, Georgia.

"Naval Dental Corps Support for Marines in Vietnam" was the title of the presentation.

CDR Hardin, who served with the Third Dental Company, Third Marine Division in Vietnam, is presently stationed at the Naval Dental School, Bethesda, Maryland.

#### GREATER MILWAUKEE DENTAL EXPOSITION

"U.S. Navy Dental 70's," a scientific exhibit developed by dental officers at the Naval Training Center, Great Lakes, Illinois, was featured at the Third Annual Greater Milwaukee Dental Exposition, held 3-5 November 1969, in Milwaukee, Wisconsin. This was the first time the Greater Milwaukee Dental Association ever featured a scientific exhibit by giving it prime programming.

The Commanding officer of the Naval Dental Research Institute, CAPT Kirk C. Hoerman, DC, USN, and his staff presented displays showing dental operating conditions encountered in the field by dental officers on duty with the U.S. Marine Corps. Also on display were enlarged photomicrographs of human enamel taken during scanning electron microscopy studies. The Chief of Dental Service, Naval Hospital, CDR Kenneth E. Brown, DC, USN, presented the results of surgical repair of high intensity wounds to the jaws and maxillofacial prosthetic restorations.

Table Clinics were presented as follows:

"The Alterations of the Tissue Surface of the Master Cast"

CAPT Gage Colby, DC, USN

"Single Appointment Post Crowns on Anterior Teeth"

CDR Curtis J. Vague, DC, USN

"A New Concept in Oral Physiotherapy"

CDR W. G. Woody, DC, USN

"Ticon in Crown and Bridge Usage"

LT Thomas C. Splitgerber, DC, USN

LT Kenneth M. Demarest, DC, USN

CAPT Carl A. Ostrom, DC, USN, is the Director, Dental Department, Naval Training Center, Great Lakes, Illinois.

#### GREATER NEW YORK DENTAL MEETING

The Joint Armed Forces Dental Exhibit, "Significant Military Contributions to Dentistry," was shown at the 45th Annual Greater New York Dental Meeting, December 1-5, 1969 in New York City.

CAPT Howard S. Kramer, Jr., DC, USN, Chief of the Dental Service, Naval Hospital, St. Albans, New York, presented "Activities of the Dental Service in Naval Hospitals."

The following films developed by the U.S. Naval Dental Corps were shown as part of the scientific film program:

Surgical Endodontics

Intraoral Roentgenography—Improved  
Equipment and Technics

Immediate Denture Service—Coordinated  
Management

Advanced Concepts of Operative Dentistry.

#### ASSOCIATION OF MILITARY SURGEONS

The Third Annual Meeting of the Far East Chapter of the Association of Military Surgeons was held November 6-7, 1969, at Tachikawa Air Base, Japan. The combined meeting was attended by Medical, Dental, Veterinary, Medical Service and Nurse Corps officers of the Uniformed Services.

The following officers of the Naval Dental Corps participated in the Professional Program—Dental Section:

CAPT F. N. Ellis, DC, USN

"A New Look at the Three-Quarter Crown as a Retainer for the Fixed Bridge"

CAPT P. C. Alexander, DC, USN

"Correlation of Roentgenographic and Clinical Aspects of Periodontal Disease"

CDR W. K. Bottomley, DC, USN

"Current Concepts in the Dental Management of the Modern Heart Patient"

CDR E. J. Messer, DC, USN

"Immobilization of Mandibular Fractures"

LCDR Z. Kawashima, DC, USN

"The Use of the Panorex X-ray Machine as an Adjunct to Periapical and Bite Wing Films"

LT John N. van der Pyl, DC, USNR

"Acid Etched Resin Restoration"

The following officers served as Presiding Officers at the two-day sessions of the Professional Program—Dental Section:

CAPT K. L. Longeway, DC, USN

CAPT L. M. Armstrong, DC, USN

CAPT R. "C" D'Vincent, DC, USN

#### TRI-SERVICE DENTAL SOCIETY

The quarterly meeting of the Tri-Service Dental Society was held recently at the Officers' Club, Yokosuka, Japan. The Tri-Service Dental Society is composed of dental officers of the Navy, Army and Air Force stationed in the Kanto Plains area.

CDR Jerome Levy, MC, USN, Head of Dermatology, U.S. Naval Hospital, Yokosuka, Japan, was the principal speaker. Doctor Levy spoke on "Oral Lesions as seen through the Eyes of a Physician."

The meeting was attended by many prominent Japanese dentists from the Tokyo-Yokohama-Yokosuka area. CAPT Kenneth L. Longeway, DC, USN, is the Commanding Officer of the U.S. Naval Dental Clinic, Yokosuka, Japan.



## ARTICLES AND ABSTRACTS

### REMOVABLE PARTIAL DENTURES DESIGNED FOR LABORATORY FABRICATION BY RECENT DENTAL SCHOOL GRADUATES A SURVEY

*CDR Robert A. Atkinson, DC, USN,\* and CAPT Robert W. Elliott, Jr., DC,  
USN,\*\* Naval Dental Clinic, Norfolk, Va. Reprinted with permission from  
J Prost Dent 22:429-435, 1969; copyrighted by the C. V. Mosby Co.,  
St. Louis, Mo.*

The entire responsibility for the design and fabrication of a removable partial denture is vested in the dentist. Smith stated that the responsibility of the dentist toward laboratory procedures is a complete one. Only the dentist has the knowledge and training to fully evaluate the problems involved, and he is not meeting this responsibility if he permits laboratory technicians to design partial dentures. This obligation cannot be delegated. A removable partial denture can be fabricated by a dental laboratory technician only under the supervision of the dentist. This supervision can be done through the use of written work authorizations. Henderson states that the work authorization of a dentist is the same as a power of attorney—it grants authority for others to act in his behalf.

It is the duty of the dental laboratory technician to follow the instructions given him by the dentist, but at the same time, it is his prerogative to demand that these instructions be such that he can follow them without question. Providing instructions for a dental laboratory technician is simplified when personal supervision by the dentist is possible but most dentists use dental laboratory facilities that are located away from the dental office. Therefore, it becomes increasingly important that the dentist be able to make his desires known to the laboratory technician by use of written communications. These can include dental laboratory work authorization cards, diagrams, mounted diagnostic casts, casts on which the design has been drawn, etc. These guidelines will vary with the individual prosthesis to be made and the preference of the dentist, but they must meet the demand that they be adequate to provide full guidance without misunderstanding.

The purpose of this study was to try to determine if a recent dental school graduate could provide the clear, concise, and meaningful instructions and designs that a dental laboratory technician would need to fabricate a removable partial denture.

#### Materials and Methods

Four diagnostic casts of partially edentulous dental

arches for which removable partial dentures were indicated were chosen to give a variety of "normal" design problems for this study. These casts were altered to provide as nearly ideal situations as possible.

Cast No. 1 was of a mandibular unilateral distal extension removable partial denture situation with an edentulous region on the opposite side that had tooth support anterior and posterior to it.

Cast No. 2 was of a mandibular bilateral distal extension removable partial denture situation.

Cast No. 3 was of a maxillary bilateral distal extension removable partial denture situation.

Cast No. 4 was of a maxillary tooth-supported posterior removable partial denture situation.

These 4 master casts (Fig. 1, not shown) were duplicated using reversible hydrocolloid and dental laboratory stone to provide 10 identical sets of 4 casts.

Thirteen necessary items were listed for a dentist to include in the design and instructions that he would send to a dental laboratory technician, to allow that technician to fabricate an acceptable removable partial denture. These items provided a base for evaluating the designs to be submitted on these duplicate casts, and were features that not only were considered to be noncontroversial but represented a minimal requirement.

#### Items of Design and Instructions To Be Evaluated

1. *Tripod marks* must be provided to allow reorientation of the casts on the surveyor table.
2. *Tooth undercuts* to be used for retention or to be blocked out must be designated.
3. *Tissue undercuts* must be indicated for blockout.

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The opinions or assertions contained herein are the private ones of the authors and are not to be construed as official or reflecting the views of the Navy Department or the Naval Service at large.

\* Fellow in Prosthodontics.

\*\* Head, Department of Prosthodontics.

4. *Reciprocation*, must be provided for in the clasp design.

5. *Reciprocal clasp arm location*, when provided, must be designed to be in nonretentive areas.

6. *Indirect retention* must be provided for in distal extension designs.

7. *Major and minor connectors* must be designed to provide adequate strength and rigidity.

8. *Connector location*, must be 2 to 3 mm from the junction of the tooth and the gingival tissue except where they cross the junction.

9. *The point of termination of the clasp retentive arms* must be marked to indicate the exact amount of undercut for each clasp tip.

10. *Work authorization cards* must provide adequate instructions, including the types of materials to be used.

11. *The area to be covered by the denture base* must be outlined.

12. *A lingual bar finish line* must locate the line of termination of the major connector in the design of mandibular distal extension dentures.

13. *Occlusal rests* must be indicated.

Four prosthodontists designed one removable partial denture, each using a different master cast. This provided a check to see if all of the requirements to be evaluated would be incorporated in the resultant designs.

The participants in this study were ten dental officers stationed at the various Naval dental activities in the Norfolk, Va. area who were recent dental school graduates. It was hoped that this study would indicate the current knowledge of recent graduates with the same general background of training. To reduce the possibility of their obtaining advance information about this examination, the candidates were contacted on an individual basis just prior to their participation in it. This program was conducted at seven different facilities on seven consecutive working days. Each individual was requested not to discuss the study with anyone else.

#### Instruction Sheet

The only information the participants received about the project was from an instruction sheet provided at the time of testing. They were asked to design a removable partial denture on each of the four casts, and to use all or any part of the material provided in order to make clear all phases of the design and construction of the removable partial dentures. No "case" history was provided, and they were to assume that all preprosthetic treatment had been

completed. There was to be no problem of esthetics in the placement of clasps.

A standard setup was arranged in a private room prior to each test (Fig. 2, not shown).

All materials used were collected at the end of the allowed period of 90 minutes, marked as a unit, and stored in individual boxes until the study was completed.

#### Grading and Evaluation

Upon completion, all of the material for grading was arranged by units, on a large table for evaluation by a panel of three prosthodontists. A sheet listing the 13 design items was used to score each unit. Evaluation was based on whether the feature in question was adequate to convey the dentist's intent to the dental laboratory technician without confusion. The resultant score for each item was the unanimous conclusion of the members of the panel (Table I).

#### Questionnaire

A questionnaire was part of each instruction sheet. The following information was requested: (1) the dental school graduated from and the year of graduation, (2) the amount of training provided by the dental school directed to removable partial denture prosthodontics, (3) the number of removable partial dentures the participant had designed and delivered while he was in his dental school, (4) what additional training in removable partial denture prosthodontics he had received after graduation from dental school, and (5) whether the respondent felt that, with his present level of training, he could provide an adequate removable partial denture service using a commercial dental laboratory without depending on that laboratory to assume any of the responsibilities that were those of the dentist.

#### Results

Nine of the participants had been graduated from dental school less than one year, and one less than two years before the study. None had received any additional training in removable partial denture prosthodontics. Ten different dental schools were represented. The number of removable partial dentures that had been designed and delivered to patients varied from 1 to 6, with the average being 3.8. Seven of those participating felt they could provide an adequate removable partial denture service using a commercial dental laboratory without depending on that laboratory to assume any of their responsibilities. Two felt they would be unable to do this, and one

TABLE 1.—The results of the study

Design features	Evaluation of removable partial denture designs										Group average for each item
	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5	Unit 6	Unit 7	Unit 8	Unit 9	Unit 10	
1. Tripod marks indicated	0*	0	X	X	X	0	X	X	0	X	60
2. Tooth undercuts designated either to be used for retention or to be blocked out	0	X	X	X	X	X	X	X	0	X	80
3. Tissue undercuts indicated for blockout	0	0	0	X	0	0	0	0	0	0	10
4. Reciprocation provided for in the clasp design	X	X	X	X	X	0	X	X	X	X	90
5. Reciprocal clasp arms designed to be in nonretentive areas	X	0	0	0	X	0	X	X	0	0	40
6. Indirect retention provided in extension cases	X	X	X	X	X	0	X	X	X	0	80
7. Major and minor connectors designed to provide adequate strength and rigidity	X	0	0	0	0	0	0	0	0	0	10
8. Connectors designed 2 to 3 mm from junction of tooth and gingival tissue except where crossing the junction	0	0	0	X	0	0	X	X	0	0	30
9. Point of termination of retentive clasp arms marked to indicate exact amount of undercut for retention	0	0	0	0	0	0	0	0	X	0	10
10. Work authorization card provides adequate instructions including types of materials to be used	0	X	0	0	X	X	X	X	X	X	70
11. Area to be covered by denture base outlined	0	0	X	0	0	0	0	0	X	0	20
12. A lingual bar finish line provided for in mandibular distal extension cases	0	0	0	X	0	0	0	0	0	0	10
13. Occlusal rests indicated	X	X	X	X	X	X	X	X	X	X	100
Individual average	38.5	38.5	46.2	61.6	53.9	23.1	61.6	61.6	46.2	38.5	46.9

\* X, Feature included; 0, feature not included.

thought he could but with reservations. The amount of training provided in the various schools varied so that no average of this factor was possible.

The results seen in Table I show a wide difference in the scores made by the participants. They varied from 23.1 percent to 61.6 percent. The average score for the group was 46.9 percent. The inclusion of individual items to be evaluated in partial denture design ranged from 10 to 100 percent.

## Discussion

No specific school of thought as to removable partial denture design was followed. Only minimal basic information, or lack thereof, was evaluated. None of the dentists questioned included all of the basic information in their instructions to the laboratory technician. In fact, the group as a whole gave the dental laboratory technician less than half of the minimal information necessary for the fabrication of a removable partial denture. Recent dental school graduates

had, on the average, designed and delivered 3.8 removable partial dentures. In spite of this, 70 percent of those who were questioned felt that they were ready to accept their full responsibility.

## Summary

This study is small, and therefore it is subject to question. The information obtained, however, indicates that recent dental school graduates did not, under the guidelines of this study, give adequate instructions to dental laboratory technicians for the design and fabrication of a removable partial denture. Perhaps more time should be allotted in the dental school curriculum to the study of the design of removable partial dentures, and how to instruct a dental laboratory technician to convert this design into reality.

(The figures and references may be seen in the original article.)



## EVALUATION OF A PROGRAMMED FREEZING TECHNIQUE IN PRESERVATION OF AUTOGENOUS DENTAL TRANSPLANTS

*CDR M. S. Burch, DC, USN, and  
LCDR G. L. Pierce, DC, USN.*

A programmed freezing technique has been used successfully to preserve various types of human tissue for transplantation. This investigation was undertaken to determine the application of this technique in the preservation of developing teeth to be used as delayed autogenous transplants. The Linde BF-3 biologic programmed freezing system was used to freeze the buds at a controlled rate. Molar and cuspid mandibular tooth buds from five puppies were removed extraorally under aseptic surgical conditions. Buds from one side of each dog were removed for freezing, and those from the opposite side immediately transplanted to the empty crypts, to serve as controls. The experimental buds were frozen with dimethyl sulfoxide at a rate of  $-1$  degree C/min, and stored in nitrogen vapor at a temperature of  $-170$  degrees C. After 2 weeks' storage they were thawed in 5 to 10 minutes and transplanted to the healing empty crypts. Three fresh molars and three that had been frozen erupted and were clinically stable within 10 weeks following transplantation. No cuspid erupted during this investigation. Oxytetracycline tagging 1 week prior to sacrifice revealed similar fluorescence in control and experimental transplants. There was no evidence of any pulpal inflammation in any transplant. Some pulpal ossification, irregular dentin formation, and external resorption were also common to both fresh and frozen transplants. It was postulated that this was due to the interruption of blood supply incident to transplantation. It was concluded that programmed freezing at a controlled rate will preserve tooth buds for a period of 2 weeks.

(Abstract by Research Work Unit: MR005. 19-6052 by CDR M. S. Burch, DC, USN, and LCDR G. L. Pierce, DC, USN.)

## ESTHETICS IN PROSTHETIC DENTISTRY

*CDR P. L. Brecker, DC, USN, and  
LCDR M. M. Stevens, DC, USN.*

The "dentogenic" concept of selection of teeth to conform to sex, age, and other characteristics of individuals has been used by prosthodontists for a number of years. However, the validity of this concept has never been tested. The purpose of this

study was to determine whether prosthodontists could ascertain sex and age from the natural dentition. Subjects selected had all twelve of their anterior teeth present and were free from large restorations and crowns. Irreversible hydrocolloid impressions were taken and study models fabricated of 22 male and 19 female subjects ranging in age from 19 to 77 years. Color photographs were used showing only the teeth and gingivae. The pictures and casts were identified as to sex and to age within 5 years by board-certified prosthodontists using the dentogenic concept. Their responses were compared with those of three nondentists. The prosthodontists were 61 percent correct in their sex determinations and 50 percent correct in their age determinations. Corresponding figures for the nondentists were 58 percent and 42 percent. The differences between the two groups were not significant. Both groups had a higher accuracy rate than would have been anticipated by chance selection alone. Though uninstructed, the nondentists were found to have made their determinations in much the same way as the prosthodontists. It was concluded that there is some validity to the dentogenic concept but not enough to use it as a sole basis for tooth selection and arrangement.

(Abstract by Research Work Unit: MR005. 19-6052 by CDR P. L. Brecker, DC, USN, and LCDR M. M. Stevens, DC, USN.)

## REDUCTION IN NUMBER OF AIRBORNE BACTERIA BY AIR CLEANING DEVICES IN A CLOSED SPACE

*CDR W. B. Shreve, DC, USN;  
CAPT L. W. Wachtel, MSC, USNR; and  
G. B. Pelleu, Jr., PhD.*

A need for reducing the concentration of microorganisms in the air of dental operatories has been assumed. The purpose of this study was to evaluate the effectiveness of two methods of air cleaning in reducing the number of airborne bacteria in a closed space. Tests for clearance of *Bacillus subtilis* spores from static and dynamic aerosols were conducted in a 700 ft<sup>3</sup> experimental room. The air cleaning devices were a portable electronic air cleaner with a capacity of 175 cfm (tested in combinations of one, two, and three) and a high efficiency particulate air (HEPA) filter module with a capacity of 800 cfm (tested singly and as a pair). Both devices cleaned and circu-

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The opinions and assertions contained herein are those of the authors and are not to be construed as reflecting the views of the Navy Department or the naval service at large.

lated room air only. The time required for complete clearance of spores from a static aerosol decreased as air capacity increased, from an average of 19 minutes at 175 cfm to 8 minutes at 800 cfm. With forced ventilation at 800 cfm, an average of 5 minutes was required. When a dynamic aerosol was disseminated over a 10-minute period, spore concentrations plateaued after several minutes, the level depending on the rate of air flow through the cleaning devices. Cleaning efficiency was maximum when the theoret-

ical turnover of room air occurred once every 1 ½ to 2 minutes. No difference was observed between the efficiency of the electronic and HEPA devices. Forced ventilation at 800 cfm produced results comparable to those of HEPA filtration at the same rate.

(Abstracted by Research Work Unit: MR005. 19-6050 by CDR W. B. Shreve, DC, USN; CAPT L. W. Wachtel, MSC, USNR; and G. B. Pelleu, Jr., PhD.)

## NURSE CORPS SECTION

### MASS CASUALTIES—FIVE DAYS A WEEK

*Providing high quality nursing care for large numbers of incoming and outgoing aero-medical evacuation patients is the goal of the nursing staff on the receiving ward at the U.S. Naval Hospital, Guam, Mariana Islands. The following is a synopsis of a paper presented by LTJG James Edward Jones, NC, USNR, at the Association of Military Surgeons, Far East Chapter at Tachikawa, Japan, in November 1969 and describes the handling of mass casualties at the hospital as part of the evacuation system.*

*The original paper was coordinated by LCDR Nancy MacDowell, NC, USNR, and authored by the following Nurse Corps officers: LT Mary Ellen Herlihy, LT Jeanne Wey, LT Sally McDonald, LTJG Margaret Wilkenson, LTJG Deirdre Keenan and LTJG James Edward Jones.*

The evolution of our special aero-medical evacuation ward goes back to 15 September 1965, when the first aero-medical evacuation patients from Vietnam to our hospital were received. Thus began for us what promised to be an extensive program of expansion. Within three months an average daily census increased from approximately 100 to well over 300. Today, four years later, the census often exceeds 700. Up to the present time we have received over 12,500 patients, ambulatory and litter, by aero-medical evacuation and returned over 9,000 to the continental United States in the same manner.

Initially, patients were received once a week, late on Friday evening. The patients were dispersed to their respective services where they were admitted, seen by the medical triage officer, fed, bathed and dressings changed as needed. As the number of flights per week increased and the number of patients per flight grew, pressure was felt throughout the hospital. Inactive wards were reopened and the staff was assigned accordingly. Approximately 1,000 pa-

tients were received by aero-medical evacuation from 1 January to 30 June 1967. Thus it became progressively more difficult to provide immediate, individualized nursing care to each new patient. Since patients were arriving late in the evening, this often required that ward routines be altered. Overhead lights remained on well after 2200 for medical workups and dressing changes, as well as for bathing and feeding of patients.

During this time the hospital administrative staff conferred, seeking a possible solution to the increasing problem. In July 1967 one ward, D-2, was designated as a receiving ward for all incoming aero-medical evacuation patients. The outgoing patients continued to be released from their parent wards. The ward selected had been used as a multi-service surgical ward, with a bed capacity of 89. The census had usually been quite low. The objective was for all incoming patients to be placed temporarily in one area where they could be immediately provided with the optimum of medical and nursing care. This concept proved to be the basis for the smooth running system of today. In April of 1968 the surgical patients were moved to another ward and D-2 was designated exclusively for incoming and outgoing aero-medical evacuation patients. At this time the ward was also designated as the casualty receiving ward during a disaster or typhoon.

The present schedule for incoming and outgoing aero-medical evacuation flights is five times per week. Special added flights are received as the need arises. We are also prepared to retain the outgoing patients for an extended period if a mechanical problem arises with the plane or if inclement weather prevents takeoff or landing at the next scheduled stop.

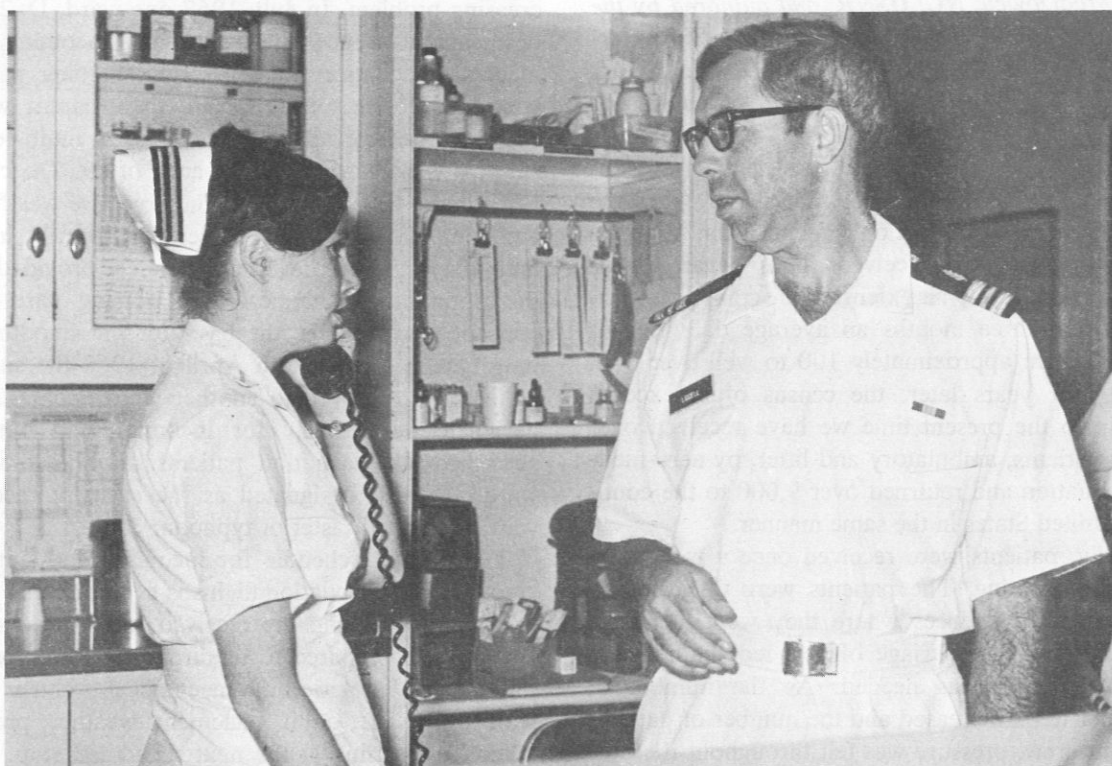
The mass casualty medical watch bill is divided into three teams with a triage officer in charge of

each. Depending upon the size of the aero-medical evacuation for a given day, either one or two groups may be assigned the duty. The second, or stand-by, team reports to the mass casualty center only if an exceptionally large number of patients arrive. On a typical aero-evac evening each member of the team will be assigned from three to five patients requiring dressing changes, histories, physicals, and admission orders. The responsibilities of the triage officer, usually a Commander or senior Lieutenant Commander, begin immediately upon off-loading of patients at Andersen Air Force Base which is approximately twenty miles from our hospital. After seeing each patient briefly, the triage officer designates to which service and with what diagnosis the casualty will be admitted. In assigning the patients to various members of the duty medical team, the senior officer attempts to utilize specialists in their particular field. However, there will be evenings when not every specialty area is represented on the duty team. On such an occasion, a patient suffering from bilateral hearing loss might be seen by an internist rather than the otologist. On the other hand, all seriously or very seriously ill patients are seen by the chief of the appropriate service, even though this might necessitate calling a doctor from a team not in a duty status.

Close behind the ambulance with the seriously ill, the buses transporting other patients, and the senior medical officer reach the casualty center, a triage list is posted and the doctors begin complete medical work-ups on their assigned patients.

Faced with the task of incorporating thirty to sixty new patients into the hospital milieu in the short span of three to four hours, the Nursing Service at our hospital had to investigate and develop methods which would insure that efficient, optimum, and individualized nursing care would be provided from the first critical hours following admission. It was concluded that in light of the military setting, a watch system would be the most feasible course to pursue if quality nursing care was to be maintained. The regularly assigned PM ward personnel on D-2, which includes one nurse and four corpsmen, would be the stabilizing force of the ward.

The first aspect of this special watch to be implemented involved the enlisted staff members. Using the work force which included all men assigned to the Nursing Service, the Hospital Corps Detail Officer drew up a watch list for each day of the week. Eleven men are now assigned on the nights when a scheduled incoming flight is expected. Six men are assigned the available watch on other nights. This is a



LTJG Deirdre Keenan, NC, USNR

LCDR Liddell, MC, USNR





breakout watch which insures that should a message of an impending special flight arrive late in the day, a basic core crew is available which could be easily complemented to full duty strength by calling men from other areas of the hospital where the work load for the night might not be quite so heavy. All corpsmen on the watch list work the day shift on their assigned wards. They are then expected to return to duty on D-2 when the patients arrive. In charge of each watch group is a senior corpsman whose duty is to confer and plan assignments of the watch crew with the charge nurse on the PM shift on D-2. During the day he is responsible for contacting the charge nurse on D-2 to find out the number of patients expected and the estimated time of arrival. Once he has this information, the senior corpsman contacts every member of the watch crew personally, informing them as to the time to report for duty on the ward. Prior to the arrival of the watch crew the charge nurse and senior corpsman confer as to assignments. When each member reports for duty he is given his assignment and all is in readiness to receive the patients.

The duties of the watch crew include: the transferring of stretcher patients from the bus into their beds; giving each bed patient complete Nursing Care; assisting the medical officers in dressing changes; checking to see that all ambulatory patients shower

and shave; serving all patients their prescribed diets; and insuring that each bedside unit is in order. When all this is accomplished the senior corpsman, with permission from the charge nurse, releases the watch crew. The two large areas in which the watch crew do not become involved are the taking and recording of vital signs and the charting of nursing notes; those are the responsibility of the regularly assigned PM personnel on D-2.

Shortly after the enlisted portion of the aero-medical evacuation watch was instituted, it became obvious that proper supervision and guidance of such a large number of para-medical personnel demanded more than the services of one Nurse Corps officer. Therefore, on 5 March 1968, the second aspect of the watch system was initiated; the AM and PM aero-medical evacuation watch for Nurse Corps officers. These lists are filled from a work force which includes all Nurse Corps officers on the hospital staff. As the names imply, the Nurse Corps officers' watch lists are composed of two distinct sections. One Nurse Corps officer is assigned from the AM shift and one assigned from the PM shift for each evening of a scheduled incoming flight.

The responsibility of the AM watch nurse begins at 1515 when she completes her duties on her assigned ward. Before leaving her ward she checks with the nurse on D-2 for the number of patients expected



LTJG D. Keenan



LTJG D. Keenan who is a co-author of "Mass Casualties—Five Days a Week"

and the estimated time of arrival; it is then her duty to return to D-2 by the time the first patients arrive. On her arrival she reports to the D-2 charge nurse for coordination of their activities. In order for the D-2 charge nurse to familiarize herself with the new patients as quickly as possible she makes bedside rounds and compiles a brief nursing care plan for each new patient. The AM watch nurse checks all patients to see if anyone needs immediate, professional care. She then assumes the responsibility for two vital areas, management of narcotic dispensing and the immediate supervision of the nursing care being provided by the watch crew. The AM watch nurse is responsible for insuring that optimum, quality nursing care and support is given to each individual patient. After the D-2 charge nurse has completed her rounds, the patients have been fed, and individualized care has been given, the next responsibility of the AM watch nurse is the transcribing of the doctors' orders which have been steadily increasing. The D-2 charge nurse at this time will assume the responsibility for medications and any further nursing care required. It is the AM watch nurse's responsibility to remain on the ward until all of the orders have been transcribed or until the D-2 charge nurse feels that she can assume the sole re-

sponsibility for completing any further duties required.

At 2300 the PM watch nurse arrives on D-2. Up to this time she has been on duty on her assigned ward elsewhere in the hospital. Her responsibility is to assist with the transcribing of doctors' orders as well as to assist with the nursing care as needed. The PM charge nurse on D-2 is at this time relieved by the night charge nurse and is free to leave; the watch nurse remains. The amount of time required of the watch nurse is determined by the number of patients received, the condition of the patients and the time of arrival.

While our mass casualty unit operates efficiently, the center is far from static. To combat complacency, constant evaluation is conducted in order to maintain optimum nursing care.

For the two years that D-2 has been operating as the receiving center for our hospital, many nursing service personnel, both officer and enlisted, have rotated through this facility bringing with them beneficial suggestions. Each suggestion is carefully appraised. Some are discarded but others are utilized and have contributed greatly to the improvement of nursing care.

## PREVENTIVE MEDICINE SECTION

### DIABETES AND HEART DISEASE: PERIODIC HEALTH EXAMINATION PROGRAM

*J. Ipsen, MD, et al, Amer J Public Health 59(9):  
1595-1612, Sept 1969.*

This study is concerned with prevalence, incidence, and annual mortality from diabetes, hypertension, and coronary artery disease among 14,092 men who had at least 2 consecutive, periodic health examinations (PHE). Four thousand eight hundred six men had or developed 1 or more of these conditions, and 1,055 men had acquired 2 or 3 of these conditions.

The age-specific prevalence of each condition is given both as prevalence among men with no other condition and as co-prevalence with each of the other conditions. There was no notable change in the overall prevalence from the 1st to the 6th PHE.

Co-prevalence for each condition was always twice the single prevalence. Presence of 2 other conditions increased the prevalence of the third condition 4 times. The annual incidence is discussed as "non-conditioned" and "conditioned." Nonconditioned means incidence among men without other diagnosis; conditioned incidence is that among men with 1 or 2 other conditions.

Conditioned incidence was about twice as high as nonconditioned incidence for each diagnosis, but the presence of 2 conditions did not increase the incidence over that of 1 condition. Nonconditioned incidence showed no change during time in the PHE program. However, conditioned incidence showed a marked decrease among those with longer exposure to the PHE program. This was particularly notable for hypertension and coronary artery disease.

Mortality rates were standardized for age and years in the PHE program. Mortality among men with diagnoses was compared with and standardized



to the population without diagnosed disease at any time during the study.

The mortality ratios were 3:6 for men with 1 or 2 diseases prevalent at first examination and 2:2 for those who developed 1 or more diseases during the PHE program. Mortality ratios for coronary artery disease were 7:8 among men who had coronary artery disease as a single or multiple diagnosis at first examination, and of the order of 3:0 for men without coronary artery disease but with diabetes or hypertension. The corresponding ratios were 68% lower among men with these diagnoses established at later examinations.

This paper contributes to the epidemiology of co-prevalent diseases. A preventive effect of PHEs seems to occur only when a person has developed a significant disease; prevention then is expressed in the diminished incidence of those diseases with which it is usually co-prevalent. There is a need to determine whether or not observation of other attributes or measurements such as obesity, smoking, or cholesterolemia, utilizing a periodic health examination program, may have a similar effect on incidence and mortality.

#### HEALTH NEEDS OF ADOLESCENTS: HOW THE ADOLESCENT SEES THEM

*A. F. Brunswick, MA, Amer J Public Health 59(9):  
1730-1745, Sept 1969*

The aim of the study was to determine how adolescents view their own health, their health needs and their health problems, and to detect any differences in view that might exist between 3 major ethnic groupings: youngsters from Spanish-speaking backgrounds, other white youngsters, and Negro youngsters.

A probability sample of 122 adolescents, 12-17 years old, living in the Washington Heights section of New York City, were interviewed in June, 1967. Trained interviewers, matched to their respondents on ethnic and sex characteristics and using a structured interview schedule developed especially for this study, interviewed each adolescent at home. The average interview lasted 2½ hours.

Findings revealed the following points.

1. Adolescents are concerned about their health and are able to provide detailed information about their own related feelings and perceptions. One in 6 adolescents considered his general health to be less than good. Negro girls and Spanish boys were most often critical of their general state of health.

2. Health practices which concerned these youngsters were:

(a) exercise, where Spanish boys reported that they do less exercise than Negro or white boys.

(b) eating, where ½ of white youngsters and Negro girls said that they eat too much. An additional 1 in 5 of the Negro girls felt that she did not eat enough. Concerning 2 other aspects of eating style, intake in snacks and regularity in number of meals, Negro girls evidenced the poorest eating patterns. Nearly half the Negro boys also reported that they eat more in snacks than in meals.

(c) smoking, where ¼ of all adolescents (23%) but 1/3 of Negro girls (33%) and ½ of the Negro boys (53%) said that they smoke too much. One-third of the youngsters smoke, ⅓ smoke at least half a pack a day. Spanish youngsters smoke less than whites or Negroes; girls smoke as much as boys, but the girls are slightly older than the boys.

(d) sleeping, where the median reported number of hours of sleep is 7½ and there is no marked deviation from this norm, either by ethnic or sex grouping.

3. The self-appraisal of general condition of teeth was more critical than the corresponding self-appraisal of state of general health. Negroes (both sexes) and white girls reported greatest dental needs.

4. Concerning vision, 4 in 10 of all Washington Heights adolescents in the sample wear eyeglasses. Very few Negro boys wear eyeglasses, but ¼ of the Negro boys reported some uncorrected visual defect.

5. Adolescents in Washington Heights were in good agreement as to the definition of major health and medical problems for adolescents: slightly less than ½ (44%) named cigarette smoking; approximately ⅓ (34%) mentioned drugs; and nearly ⅓ (32%) indicated drinking. Almost 1 in 5 (18%) mentioned air pollution. Here the question arises whether public health professionals have sufficiently concerned themselves with this cluster of social health issues voiced by adolescents.

6. Some other attitudes may be significant for those interested in improving health services and health practices in this age group. Four-fifths of the Spanish and Negro youngsters said that being healthy mattered a lot to them. Negro boys indicated a high degree of conviction about the avoidability of illness, but Spanish boys showed considerable fatalism about it. Negro boys evidenced high regard for their physical appearance.

## CUTANEOUS ANTHRAX —RHODE ISLAND

USDHEW PHS NCDC Morb & Mort Wkly Rep  
294, Aug 23, 1969.

In July 1969, cutaneous anthrax was confirmed in a 64-year-old man, a mechanic at a Rhode Island company that scours and cards camels' hair and cashmere for spinning into yarn by other companies. On 17 July while cleaning the rollers of a carding machine, this man sustained several cuts on his right hand. By 19 July, all the cuts had healed except for the one on his right index finger, which progressed from a small pruritic papule to a blue-black vesicle. On 24 July he consulted a dermatologist who suspected cutaneous anthrax and hospitalized him. The diagnosis was subsequently confirmed by culture. On admission the man appeared well, was afebrile, had no axillary adenopathy, but presented a 1.5 cm nontender pruritic lesion on his right index finger. By 25 July he had developed several 2 to 3 cm nontender axillary nodes, and by 27 July he developed marked swelling of the finger and dorsum of the wrist and a low grade fever of 100° F. He was treated with penicillin, made an uneventful recovery and was discharged on 2 August.

Although no cases of anthrax had been recorded by the company in the last 10 years, 2 other probable cases were found during the investigation of this confirmed case. Both men, 1 with onset in February and 1 in April had had a slow healing lesion that retrospectively seemed compatible with cutaneous anthrax; both were employed as mechanics, performing the same work as the confirmed case, and both had incurred minor injuries to the area where the lesions subsequently developed.

The company scours and cards raw hair using processes which clean, subsequently separate and align the fibers producing a thick, loosely packed rope. The raw hair is obtained directly from Iran and Afghanistan; a considerable amount is obtained from Mongolia and other countries through a company in Belgium. Investigation revealed that the processing areas at the Rhode Island company are dusty, inadequately ventilated, and cleaned sporadically. Of 12 environmental samples collected, 7 were positive for *Bacillus anthracis*. Of 13 hair samples collected, 4 were positive; 2 of these were unprocessed hair and 2 had been scoured. After additional epidemiologic investigation is completed, appropriate recommendations will be made.

Editorial Comment: *The evolution of the local lesion with the resolution of systemic symptoms and*

*surrounding edema following antibiotic therapy is classic for cutaneous anthrax.*

*The recovery of B. anthracis from 7 out of 12 environmental specimens indicates significant environmental contamination at this plant and may represent inadequate housekeeping. The recovery of B. anthracis from 4 out of 13 gross samples indicates a constant risk to employees handling these materials.*

## NEW FINDINGS IN HEPATITIS RESEARCH

County of Los Angeles Health Dept Morb & Mort,  
38th Rep, Wk ending Sept 20, 1969.

Viral hepatitis is a common infectious disease with considerable associated morbidity and potential mortality. The term viral is technically a misnomer since no true infectious viral or bacterial agent has ever been isolated from affected patients. Early investigations did, however, rule out bacteria as the causative agent and as a result the medical community has accepted the theory that a yet unidentified virus is the infectious agent.

Traditionally, two distinct types of hepatitis are described. Infectious hepatitis is generally contracted by person-to-person spread (or parenterally) with an incubation period of 15 to 50 days. So called serum hepatitis has a longer incubation period of 6 weeks to 6 months and is thought to be transmitted only via the parenteral route (contaminated needles or blood transfusions). Some recent investigations indicate that serum hepatitis might also be contagious with person-to-person spread, presumably via the fecal-oral route. Evidence also exists which indicates that once a person has had one type of hepatitis he is immune to it, but susceptible to the other type.

Most of this evidence leads to the conclusion that there are probably 2 different types of hepatitis. Definitive investigation directed at distinguishing the two has long been hampered by lack of a demonstrable causative agent. During the past 2 years, several investigators have accumulated evidence for the presence of an antigenic substance in the serum of patients with hepatitis. This substance has already been used in several enlightening epidemiological investigations.

The antigenic substance has been called the "SH" (Serum Hepatitis) or "Australia Antigen." This antigen was first found in the sera of Australian aborigine populations. It was found only very rarely in the American or European population except in patients with Down's Syndrome, leukemia, and hepatitis. The presence of this peculiar antigen is demon-

strated by a relatively simple precipitin reaction on agar gel plates.

Further work with the antigen has elucidated several fascinating facts:

1. It is found more typically in classic serum or long incubation hepatitis than in patients with infectious hepatitis. This accounts for the term "SH" antigen.

2. Presence of the antigen in the patient's serum closely parallels the course of the illness. That is, the SH antigen appears just before liver abnormalities are evident and disappears about the same time that liver function tests return to normal.

3. In occasional instances, the antigen persists long after the acute illness, and may identify those asymptomatic carriers of the virus who are potentially dangerous as blood donors.

4. SH antigen has been identified in random blood transfusion units. Patients given transfusions from SH positive units have developed hepatitis with long incubation periods. Blood taken subsequently from these patients is positive for SH antigen during their bout of hepatitis.

5. Patients with chronic kidney failure often develop serum hepatitis due to frequent transfusions. For unknown reasons most of these uremics tend to remain antigen positive for many months after recovering from hepatitis. This persistence of antigenemia may well explain the high risk of hepatitis among hospital personnel caring for uremic patients in dialysis units.

6. Electron microscopic studies indicate that the antigen-positive fraction of serum contains "virus-like" particles, thus bolstering the long held suspicion that the etiology of hepatitis is indeed viral.

In summary, it appears that an identifiable agent for serum hepatitis exists. Its identification will be an invaluable epidemiological tool in differentiating types of hepatitis. Further work might also resolve the question of whether "serum" hepatitis can be transmitted by person-to-person spread without needles or blood transfusions. It might also eventually become possible to screen blood donations in order to prevent transfusion-associated serum hepatitis.

#### DISINFECTANT, FOOD SERVICE

A disinfectant for use in disinfection of mess gear and fresh fruits and vegetables is now available through the Navy Supply System. The product is packaged in pouches and one pouch is sufficient for treating 25 gallons of water. This disinfectant is to be used for all food disinfection in lieu of calcium hy-

pochlorite, (HTH). Directions for usage are contained in the package.

The product offers an advantage over calcium hypochlorite in that it is stable and therefore presents no safety hazard in storage.

Procurement information:

Disinfectant, Food Service  
(Chlorine-Iodine type)

FSN	Unit of Issue	Price per unit
6840-810-6396	pouch	\$.55 each

*Description:* For disinfection of mess gear, fresh fruits, and vegetables. (4.77 oz net—quantity for 25 gallons of water.)—Sanitation Sec, BuMed.

#### FDA ANNOUNCES DRUGS TO FIGHT DDT

*Mass Dept of Public Health, "This Week in Public Health," 18(34): 333, Aug 25, 1969.*

The Food and Drug Administration recently reported that two drugs used widely to control convulsions can rid the human body of residues of the pesticide DDT. The statement cautioned that "the medical significance of the discovery has not yet been established." The evidence was uncovered by scientists conducting an FDA community pesticide study in Dade County, Florida.

The study showed that 125 patients taking either phenobarbital or diphenylhydantoin to control convulsive disorders had in their blood "strikingly lower levels of DDT" than other persons in the community. A research team at the FDA's Dade County Miami Project confirmed the data by examining blood and fat samples obtained in routine examinations and surgical procedures at the State-operated Sunland Training Centers in Miami and Orlando, Florida. Earlier studies indicated that the DDT residue level averages 8 to 16 parts per billion in the blood of the average population. This information is interesting in the light of the recent move to eliminate the use of DDT in the United States.

#### OUTBREAK OF STAPHYLOCOCCAL DISEASE

*USDHEW PHS NCDC Morb & Mort Wkly Rep 18(39): 339, Sept 27, 1969.*

In June and July 1969, an outbreak of disease due to *Staphylococcus aureus* occurred in association with the private practice of a physician in Dayton, Ohio. Most of the patients were admitted to a local 500-bed general hospital where phage-typing of the staphylococci was performed.



Eight isolates of phage type 80/81 *S. aureus* were identified by the hospital's bacteriology laboratory during the 5-month period from 1 Jan through 31 May; however, from 14 June through 9 July, 13 isolates were obtained. One of these latter 13 isolates was from the implicated physician. Of the remaining 12 patients with isolates obtained during this period, 1 had no evidence of clinical disease or known contact with this physician; the remaining 11 patients had all been treated by him, and all but 2 had undergone a medical or surgical procedure at, or near, the site of subsequent infection. These infections included 1 case of impetigo after an abrasion, 2 cases of septic arthritis (1 after diagnostic aspiration and 1 after injection of medication into the joint), 5 cases of deep muscular abscesses after intramuscular injection, and a postpartum episiotomy infection with septicemia. Of the 2 patients who had not had procedures at the site of subsequent infection, 1 had presented with a sty, later developed vaginitis and underwent a vaginal examination. She subsequently developed buttock abscesses. The other had a deltoid intramuscular injection and developed impetigo on her wrist and legs.

Nasal and pharyngeal cultures of physicians and hospital personnel revealed no carriers of type 80/81 *S. aureus*. The physician involved in the 11 symptomatic cases had been in good general health except for chronic dermatitis of the hands. Although he was unaware of prior staphylococcal disease or carriage, between 24 June and 3 July he became aware of chin, thigh, and finger lesions. Coagulase positive *S. aureus* phage type 80/81 was later cultured from the chin and finger lesions. Of 313 patients seen between 23 and 27 June, 6 (1.9%) developed disease, whereas of 252 patients seen between 10 and 13 June and of 318 patients seen between 16 and 20 June, 2 (.8%) and 1 (.3%), respectively, developed illness. He stopped seeing patients on 3 July and was admitted to the hospital on 5 July for treatment.

Appropriate isolation measures prevented spread of the strain from the hospitalized physician to the other patients. Post-therapy cultures of the physician and follow-up cultures of hospital personnel were negative.—Sanitation Sec, BuMed.

#### DYSENTERY—GUATEMALA

USDHEW PHS NCDC Morb & Mort Wkly Rep  
18(4): 367, Oct 18, 1969.

In January 1969, an increase of severe dysentery was reported from 3 villages in South Guatemala. Subsequently, reports of a similar severe form of

diarrhea were received from towns and villages in widely scattered parts of the country. Cases occurred in all age groups, with high mortality rates especially in school and pre-school children. *Shigella dysenteriae* type 1 (Shiga's bacillus) was isolated in August and has been confirmed by bacteriologic and serologic methods in several areas where outbreaks have occurred.

Severe rains and flooding may have been a factor in recent spread. Similar flood conditions in a neighboring country and reports of dysentery near international borders raise the possibility of involvement of areas outside Guatemala.

*In vitro* antibiotic sensitivity studies have indicated that the organism is resistant to tetracycline, chloramphenicol, novobiocin and sulfamethoxypyridazine. Preliminary results indicate that erythromycin, kanamycin, and nalidixic acid are clinically effective. An epidemiologic investigation is in progress.

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Editor's Note: *Shigella dysenteriae* 1 is an extremely rare serotype accounting for only a fraction of 1% of all isolates reported in the United States. Recently, there has been a significant increase in the number of isolates reported. In 1964 none were reported, in 1965 there was 1; in 1966 and 1967, there were 2 each year and in 1968 3. In 1969, however, a total of 12 isolates have thus far been reported, 9 in the third quarter. Epidemiologic information available on 5 of these isolates indicates that 4 infections were acquired after travel to Mexico and 1 after travel to Ethiopia.

The last reported outbreak of dysentery due to the Shiga bacillus in the U.S. occurred in the summer of 1938. The outbreak spread from a group of migrant Mexican workers to individuals in the City of Owosso, Michigan. Person-to-person transmission was the alleged mode of transmission. The disease was of a virulent type with 10 deaths among 45 recognized cases, a fatality rate of 22.2%, all in children under age 8. A similar high fatality rate was reported by Japanese workers early in the century when the disease was endemic in that country.

Patients who develop diarrhea during or after travel to Mexico or countries of Central America should be cultured to rule out *S. dysenteriae* 1 infections. The severe form of the disease has a characteristic picture of diarrhea with blood and mucous, usually with tenesmus, dehydration, prostration, and fever. Milder forms of the disease cannot be differentiated from diarrhea due to a variety of other causes. A serologic test is available to assist in diagnosis.

## ENVIRONMENTAL ASPECTS OF THE HOSPITAL

*Environmental Aspects of the Hospital* is a 4-volume set published by the U.S. Department of Health, Education and Welfare, Public Health Service and is available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20401 at the below prices:

Vol. I Infection Control	#930-C-15	\$0.45
Vol. II Supportive Department	#930-C-16	\$0.40
Vol. III Safety Fundamental	#930-C-17	\$0.40
Vol. IV Administrative Aspects	#930-C-18	\$0.25

A brief synopsis of each volume follows.

*Vol. I Infection Control:* Public health aspects of the hospital as well as principles of bacteriology and epidemiology are considered. The chapter on infection control deals not only with the disease aspect but also with administrative procedures and environmental conditions surrounding cause and prevention of hospital infections. A review of decontamination, methods of cleaning, disinfection, and sterilization is given.

*Vol. II Supportive Departments:* This volume relates to the environmental aspects of supportive departments and includes comprehensive planning procedures and programs for:

Housekeeping Service	Dietary Services
Solid Waste Handling	Laundry Services
Insect and Rodent Control	

*Vol. III Safety Fundamentals:* Safety features applicable throughout the hospital environment are presented. A comprehensive study of preventive as well as supportive programs is outlined in such areas as:

Fire and Disaster	Radiation
Laboratory	Flammable Gases

*Vol. IV Administrative Aspects:* This volume relates to specific legal and general administrative concepts. Standards and regulations are discussed in detail.

All volumes provide invaluable information for

planners and supervisors in the environmental health aspects of hospital management. Outlines for effective programs leading to safer and more efficient hospital conditions as presented.

Although structured specifically for hospitals, these books are useful in other medical areas, including out-patient areas, shipboard medical facilities, etc. All personnel concerned with environmental health and infection control in the medical field are encouraged to utilize these publications to their maximum extent.—Sanitation Sec, BuMed.

## HOW TO CONTROL FOOD POISONING, CROSS INFECTION, FOOD SPOilage AND INSECT CONTAMINATION

### Simple Guidelines

*The Soap and Detergent Association Release in "Tips on Cleaning" 2(4), Sept 10, 1969.*

Food poisoning, cross infection, food spoilage and insect contamination are a constant danger to departments handling food.

Sanitary techniques must be observed in handling foods, utensils and serving dishes.

Employees must understand that because they are handling food products they must not contaminate them.

Food handlers must be free from any communicable diseases or infections and they must *be* clean and *work* clean.

Every surface of equipment and structure in the food preparation and serving areas must meet certain standards of cleanliness which are:

*Physically Clean*—Absence of visible soils, no friction to touch.

*Chemically Clean*—Absence of soap and chemical residues.

*Bacteriologically Clean*—Absence of organisms capable of causing food poisoning, cross infection or spoilage.

*Entomologically Clean*—Absence of insects.

*Osmologically Clean*—Control of obnoxious odors that might migrate from food areas and cause annoyance or discomfort to patrons, visitors and staff.

## KNOW YOUR WORLD

### Did You Know?

That 2,283 cases of human encephalitis occurred in the United States in 1968, with 260 deaths?

In 1967 there were 2,386 cases and 3,102 cases in 1966.

Of the reported cases of encephalitis, 2/3 were of

unknown etiology; 130 were due to arboviral infection. Twenty-three of the 35 reported cases of St. Louis encephalitis (SLE) represented an outbreak in southeastern Illinois, in September. There were 12 cases of Eastern Equine Encephalomyelitis (EEE), 11 of which occurred in humans in New Jersey. The SLE cases in Illinois and the EEE cases in Jersey constituted the 2 discrete outbreaks of arboviral encephalitis coming to the attention of the NCDC Atlanta, in 1968. The first documented, naturally occurring, symptomatic, human infection with Venezuelan Equine Encephalomyelitis (VEE) virus in the United States occurred in Florida in 1968.

A total of 502 cases of encephalitis occurred associated with measles, mumps, chickenpox and rubella.<sup>1</sup>

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That Guam has lifted the embargo on importation of dogs and cats?

Because of an epidemic of rabies in Guam in 1967, an embargo on the importation of all dogs and cats into the territory was effected on 3 Aug 1967. An extensive rabies control program on the island has been successful; no rabies cases have been reported since November 1967. Combined, coordinated efforts of the Government of Guam, United States Air Force and Navy, Bureau of Sports Fisheries and Wildlife and the Public Health Service, enabled Guam to minimize the danger to the public's health. On 16 Sept 1968, the Governor of the Territory of Guam lifted the year-long embargo; however, only cats and dogs from rabies-free areas—Hawaii, New Zealand, Australia and Great Britain—will be permitted to enter until quarantine facilities have been completed on the island.<sup>2</sup>

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That in 1968, in the United States, 25 outbreaks involving 1,105 individuals were reported to the Salmonella Surveillance Center, NCDC?

Of 13 foodborne outbreaks, 11 were traced to a specific contaminated food, including 5 caused by turkey, 3 by eggs, 2 by pork and 1 by beef. In 2 foodborne outbreaks, the specific food could not be identified. Seven outbreaks involving 27 individuals were traced to household pets. Although it was not firmly established in all instances that the pets caused the human illness and not vice versa, the circumstances of these outbreaks favor the former explanation. Four outbreaks involving 65 individuals occurred in hospitals or nursing homes. Person-to-person contact was thought to be the primary mode of spread in all. The etiology of all outbreaks was confirmed bacteriologically, but many of the 1,105 ill individuals were never cultured and are not included

as reported isolations for the national surveillance data. Thus only a small fraction of the total 19,740 isolations of salmonellae in 1968 were from reported outbreaks. This suggests that many outbreaks are never investigated.<sup>3</sup>

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That on 25 March 1969, South Dakota became the 6th state to enact legislation to require fluoridation of public water supplies?

Fluoridation laws have been enacted in Connecticut, Minnesota, Illinois, Delaware and Michigan. As of 31 Dec 1968, fluoridation totals reached 74.5 million persons. Kentucky is the only state to make fluoridation one of the standards for approval of a public water supply, under regulations adopted by the state board of health in 1966.<sup>4</sup>

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That newly named "International Health Regulations" were adopted by the Twenty-second World Health Assembly to replace the International Sanitary Regulations in force since 1952?

The new Regulations will be instituted on 1 January 1971, according to the Committee on International Quarantine of the WHO, which has been working for the past two years on revision and improvement of the requirements.<sup>5</sup>

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That 568 cases with 52 deaths of poliomyelitis were reported for 1968 from Venezuela?

Three hundred twenty-eight were paralytic, 17 non-paralytic, 174 unclassified and no information was available in 49. By age groups 163 cases were under 1 year old, 377 from 1–4 years, 22 from 5–15 years, and 6 were 15 years old and over.

Of 113 reports of poliomyelitis from Jan to June 1969, 20 cases have been virologically and serologically confirmed, including 11 paralytic, 1 nonparalytic and 8 unspecified.<sup>6</sup>

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That in Hittnau (Canton of Zürich), 3 children of the same family fell ill with diphtheria in October 1969 and 1 of them died?

Two further cases and 4 carriers were discovered after examination of about 600 persons in the neighborhood. A concomitant outbreak of scarlet fever, with 50 cases, has in some instances complicated the diagnosis.<sup>7</sup>

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That England recorded its first case of animal rabies since 1922 in Oct 1969, in an animal outside of a government approved quarantine kennel?

A 2-year old terrier, belonging to a major who had been stationed in West Germany, was implicated. Just 10 days after completing the required 6-month quarantine, the terrier escaped from the owner's



household, attacked a milkman, bit the owner's wife and killed a cat during an approximately 30 minute interval before he was captured and impounded. Rabies was confirmed on 18 Oct 1969. A total of 23 persons, about 1/2 of whom are children, are undergoing antirabies treatment because of exposure to this rabid animal. England is the only country in Western Europe to have such a strict control over the movement of pets, which are held 6 months in quarantine at the owner's expense.<sup>8</sup>

That the WHO Regional South East Asian Committee endorsed the WHO program for Southeast Asia for 1971 at a cost of US \$9,831,500?

On 5 October 1969, the 22nd Session held in Kathmandu, Nepal, recorded that the WHO will provide US \$7,514,000 from its regular budget and the United Nations Development Program will furnish US \$2,317,500.<sup>9</sup>

That about 15.1 million fish died in the U.S. as a result of water pollution in 1968?

This represents an increase of 30% over 1967, which may be due in part to better reporting, but the bulk is a real increase. The largest fish kill occurred when a petroleum refinery lagoon leaked chemicals into the Allegheny River, killing 4 million fish. Two-thirds of the fish killed during 1968 had commercial value. Since the kill census began in June 1960, 103

million fish have been reported killed in 2,830 incidents.<sup>10</sup>

That Salmonella-bearing turtles have caused illness in children of the greater Boston area?

A warning against the purchase of pet turtles was issued recently by the Commissioner of the Massachusetts State Public Health Service. These small turtles sold at retail outlets may be carriers of salmonella organisms which cause illness in youngsters who often handle the pets. Illness is caused when hands or articles, contaminated by salmonella, are brought to the mouth permitting the organism to enter the intestinal tract. Nausea, diarrhea and intestinal cramps generally follow an 8-to-10 hour incubation period.<sup>11</sup>

#### References

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5. WHO Chron 23(10): 456, Oct 1969.
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8. USDHEW PHS NCDC Vet Public Health Notes, Oct 1969 (London Daily Express Oct 21, 1969).
9. WHO Regional Office for SEA Press Release 916/RCM-7 of Oct 6, 1969.
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## EDITOR'S SECTION

### LETTER FROM THE SURGEON GENERAL TO CAPTAINS AND COMMANDERS, MC

It is my belief that one of the motivating factors which led us to choose a career in the U.S. Navy was the opportunity to serve our country. It is also my belief that having chosen the Navy Community which is primarily sea oriented, you desire to be a part of the seagoing Navy in a truly operational manner. For a great majority of our more senior medical officers however, that privilege has been denied by the pressing need to embark upon a career in clinical medicine, serving on subsequent tours in purely professional and pedagogical assignments. You may now have the desire and opportunity to serve in the operational forces of the Navy. In addition to the inherent challenge for those of adventuresome spirit, such assignments may also open the door to other

facets of medicine which are interesting and certainly worthwhile in staff or administrative billets. An excellent background in the clinical medicine disciplines will enhance the type and quality of medical services available to the Navy Community at large, be it with the Fleet, at the Bureau of Medicine and Surgery, with the Marine units, or in research, preventive, industrial or occupational medicine.

Such assignments, of one or two years' duration, do not preclude future assignments in clinical disciplines. The following list indicates choices which are possible.

1. Command:  
Hospitals and Naval dispensaries  
AH—Sanctuary and Repose

2. Senior Medical Officers:
  - Naval Support Activity, DaNang (NSA Hospital)
  - Naval Training Center dispensaries
  - Marine Corps Recruit Depot dispensaries
  - Naval Station dispensaries
  - Marine Corps bases
3. Staff Medical Officers:
  - Force Medical Officer—Amphibious Submarine
  - Cruiser-Destroyer
  - Naval Air
  - Chief of Naval Air Reserve Training
  - Commander Naval Forces Vietnam
  - Commander in Chief, U.S. Naval Forces Europe
  - Commander in Chief, Pacific Fleet
  - Commander in Chief, Atlantic Fleet
4. Staff Medical Officers in Tri-Service Billets:
  - Department of Defense
  - Commander U.S. Military Assistance Command, Vietnam
5. Fleet Marine Force:
  - Surgeon, III Marine Amphibious Force
  - First Marine Division
  - First Marine Airwing
  - Second Marine Division
  - Second Marine Airwing
  - Third Marine Division
  - Third Marine Airwing
  - Staff Medical Officer, Fleet Marine Force Atlantic, and Fleet Marine Force Pacific
  - Commanding Officer, First Medical Battalion
  - Commanding Officer, First Hospital Company
  - Commanding Officer, Third Medical Battalion
6. Research:
  - (a) Departmental (Staff) Bureau of Medicine and Surgery, Office of Naval Research, Chief of Naval Operations-07, DSSP
  - (b) Field Naval Medical Research Institute
    - Naval Medical Research Units 1, 2, 3, and 4
    - Submarine (SMRL) or Aviation (Naval Aerospace Medical Institute) (AARD) Research
    - Clinical Investigation Center, Naval Hospital, Oakland

Naval Medical Neuropsychiatric Research Unit

Naval Blood Research Laboratory  
 Armed Forces Institute of Pathology  
 Armed Forces Radiobiology Research Institute

7. Industrial Medicine:
  - (a) Shipyard—Boston, Philadelphia, Norfolk, San Francisco Bay, Pearl Harbor
  - (b) Naval Ordnance System Command Activities
  - Naval Support System Command Activities

8. Preventive Medicine:
  - (a) Preventive Medicine Units
  - (b) Bureau of Medicine and Surgery

The Staff Colleges, while not medically oriented, are broadening in the managerial and command sense and deserve serious consideration. These are:

Naval War College, Newport, R.I.  
 Industrial College of the Armed Forces, Washington, D.C.

Junior and Senior Staff College, Norfolk, Va.  
 Armed Forces Staff College, Norfolk, Va.

The Army Staff College at Carlisle, Pa. and Air Force Staff College at Montgomery, Ala. might interest some of you.

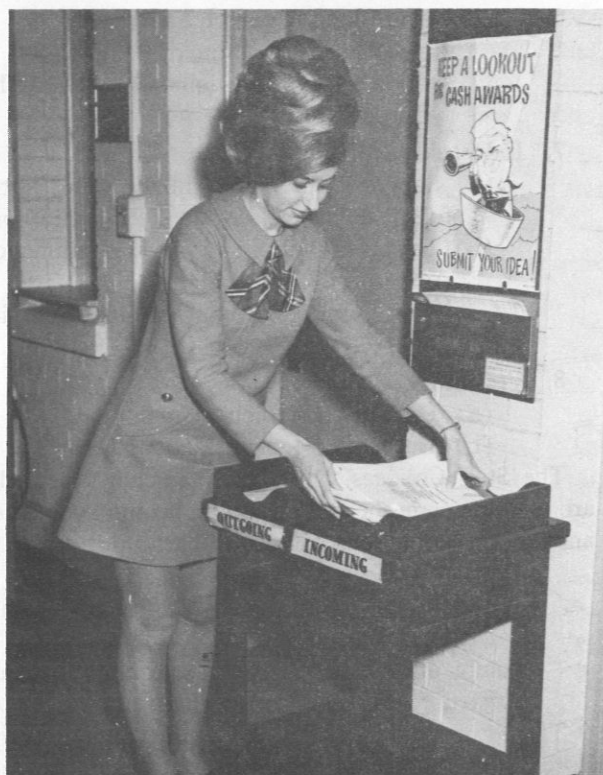
Outservice Training billets leading to advance degrees and board eligibility in Public Health or Occupational Medicine are available for those qualified, who may be interested in careers in Industrial or Preventive Medicine.

A quick review of the foregoing list reveals a wide variety of interesting and rewarding assignments. There are added attractions such as overseas travel, support of the operational Navy, additional professional qualifications enhancement, and further post graduate training.

As the year 1970 commences, I urge you to seriously consider the opportunities presented for expanding and broadening your careers. The proposed assignments would further provide for the continuation of professional achievement and reassignment to a clinical billet should you so desire.

The Professional Division of the Bureau of Medicine and Surgery welcomes any requests or questions which you may have concerning such an assignment. You are strongly encouraged to call or write for additional information or details.

## INTRODUCING .....



Mrs. Virginia Novinski, the new Assistant Editor. A welcome addition to the masthead, Mrs. Novinski is not new to the Newsletter, having guided it over seas both calm and turbulent for several years. She is as delightful to work with as she is to look at. Her numerous attributes include an agile wit and sustained industry, unexpectedly crowned by imperturbable equanimity.

Mrs. Novinski admits to a decided weakness for attractive men in blue uniforms, having met her husband when he was serving on active duty in the U.S. Navy. He now wears another blue uniform, that of the District of Columbia Police Department. Our new Assistant Editor has a yen for swinging copy and good pictures of you in action. She checks the incoming mail several times daily, hoping to hear from you. Won't you write?

### RESIDENCY TRAINING OPPORTUNITIES

Listed below are the vacancies in residency training programs within the Navy which will be available on 1 July 1970.

#### *Anesthesiology*

2nd year level at:

Naval Hospital, St. Albans, New York

Chief of Service: CDR Richard M. Norton

#### *Internal Medicine*

2nd year level at:

Naval Hospital, Great Lakes, Illinois

Chief of Service: CAPT Robert H. Easterday

Naval Hospital, St. Albans, New York

Chief of Service: CAPT W. S. Myers

#### *Pathology*

1st year level at:

Naval Hospital, Bethesda, Maryland

Chief of Service: CAPT Frank G. Steen

Naval Hospital, Philadelphia, Penna.

Chief of Service: CAPT W. A. Schrader, Jr.

Naval Hospital, St. Albans, New York

Chief of Service: CDR Francis W. Wachter

Naval Hospital, San Diego, California

Chief of Service: CAPT Robert M. Dimmette

2nd year level:

Naval Hospital, St. Albans, New York

3rd year level:

Naval Hospital, Philadelphia, Penna.

Naval Hospital, St. Albans, New York

#### *Psychiatry*

1st year level:

Naval Hospital, Bethesda, Maryland

Chief of Service: CAPT Thomas H. Lewis

Naval Hospital, Oakland, California

Chief of Service: CDR Victor M. Holm

Naval Hospital, Philadelphia, Penna.

Chief of Service: CDR Dudley E. Brown

2nd year level:

Naval Hospital, Bethesda, Maryland

Naval Hospital, Philadelphia, Penna.

#### *Pulmonary Disease*

Naval Hospital, St. Albans, New York

Chief of Service: CDR Robert C. Elliott

Naval Hospital, San Diego, California

Chief of Service: CDR John William

Brackett, Jr.

#### *Radiology*

3rd year level:

Naval Hospital, San Diego, California

Chief of Service: CAPT Deck E. Chandler

#### *Surgery*

2nd year level:

Naval Hospital, Great Lakes, Illinois

Chief of Service: CAPT Roger F. Milnes

Naval Hospital, Philadelphia, Penna.

Chief of Service: CAPT Robert J. Cales

3rd year level:

Naval Hospital, Philadelphia, Penna.



### *Thoracic Surgery*

Naval Hospital, St. Albans, New York  
Chief of Service: CDR Barclay M. Shepard  
Naval Hospital, San Diego, California  
Chief of Service: CAPT Max J. Trummer

For further information, please contact the Chief of Service at the hospital or call CAPT E. J. Rupnik, MC, USN, Head, Training Branch, Bureau of Medicine and Surgery, Area Code 202 OX6-5134; or CAPT J. W. Cox, MC, USN, Assistant Head, Training Branch, Area Code 202 OX6-5184. Applications should be forwarded through the chain of command to Chief, Bureau of Medicine and Surgery (Code 316), Navy Department, Washington, D.C. 20390.

### DIAGNOSIS TERMINOLOGY AND CODING

Since April of 1969, representatives of the Medical Departments of the Armed Forces have been working together to select and recommend a uniform system of medical terminology. The result of their labors was a Department of Defense Instruction (number 6040.33) which directs the Armed Services to base diagnosis nomenclature for medical records on current editions of the "Standard Nomenclature of Diseases and Operations" and "Current Medical Terminology." The same DOD Instruction directs statistical classification of diseases according to the Eighth Revision of the International Classification of Diseases of the World Health Organization. Changeover from the system of terminology and coding based upon the Department of Defense Disease and Injury Codes is effective 1 January 1970.

BuMed Instruction 6310.5C and a revision to BuMed Instruction 6310.8 will supply details of implementing the standard terminology and coding. Of particular interest to medical officers is the fact that the terminology is easy to use, and that the medical officers will not be responsible for the coding function. They will, however, be required to assign diagnoses from one of the two references listed above and to cooperate with the coders. Where unusual or new terms are used, the coder will be required to consult with the cognizant medical officer for assistance in selection of the proper code. This insures that data collection will be accurate and data retrieval useful. Medical officers are advised to study BuMed Instruction 6310.5C for the few special diagnostic terms applicable to military medicine and comments relative to several specific diagnoses.

At a recent meeting sponsored by the American Medical Association, a plea was made for just such a

standardized system of terminology and coding as the Armed Forces are now adopting. The method is accepted by the A.M.A. and is in use in most civilian medical facilities, the Veterans Administration, and the U.S. Public Health Service. The net result of bringing the Armed Services into the same family of terminology and coding is expected to be a better exchange of information, easier conversion to modern morbidity data collecting and more accurate and complete data retrieval. Any changes which bring the military medical facilities into line with practices acceptable to the civilian community cannot help but be beneficial.—Code 33, BuMed.

### AFIP COURSE IN ORAL PATHOLOGY

The 17th Annual Armed Forces Institute of Pathology Course in Oral Pathology will be given at the AFIP from 2-6 March 1970. The course is open to civilian and military dentists and physicians. Early application is advised.

The course is presented by specialists in oral and general pathology, oral surgery, periodontics, dental research and cancer investigation. It is designed to provide dentists, physicians and trainees in oral and general pathology with a fundamental knowledge of various aspects of oral disease and recent developments in this field. Developmental disturbances of the head, neck and oral region, inflammatory diseases of the oral mucosa and jaws, the oral manifestation of certain systemic diseases and neoplasms of the oral cavity and related structures, will be discussed in detail. Clinical, roentgenographic and microscopic characteristics will be illustrated. Lectures will be correlated with case presentations and microscopic slide seminars will be held at evening sessions.

To apply, contact The Director, Armed Forces Institute of Pathology, ATTN: MEDEM-PAD, Washington, D.C. 20305.

### FAMILY PRACTICE CERTIFICATION

The American Board of Family Practice has announced that it will give the first examination for certification in 35 various centers throughout the United States. The examination will extend over a 2 day period, February 28-March 1, 1970. Information regarding the examination and eligibility for the examination can be obtained by writing: Nicholas J. Pisacano, M.D., Secretary; American Board of Family Practice, Inc.; University of Kentucky Medical Center; Annex #2, Room 229; Lexington, Kentucky 40506.

The first examination will be offered to only 2,000 applicants on a first come, first served basis according

to geographical distribution. Others among the first group of applicants who are found to be eligible, will be allowed to take the examination at a second session that will follow shortly thereafter. Satisfactory completion of the examination will lead to designation as a charter member.

#### ASSOCIATION OF MILITARY SURGEONS

VADM George M. Davis, MC, Surgeon General of the Navy, assumed office as President of the Association of Military Surgeons during the 76th annual meeting held 16-19 November 1969 in Washington, D.C.

Two Navy Medical Department officers were honored by the Association. The Sir Henry Wellcome Medal and Prize were awarded to CAPT Bruce H. Smith, MC, Director of the Armed Forces Institute of Pathology, for his essay "Fatal Motorcycle Accidents of Military Personnel." LT Richard G. Buckles, MSC, received The Sustaining Membership Award for his work on a holomicrography system for study of gas formation in humans as related to decompression sickness.

Other members of the Navy Medical Department made substantial contributions to a series of excellent presentations and scientific exhibits. To all hands we extend a hearty "Well Done"!

#### IN MEMORIAM

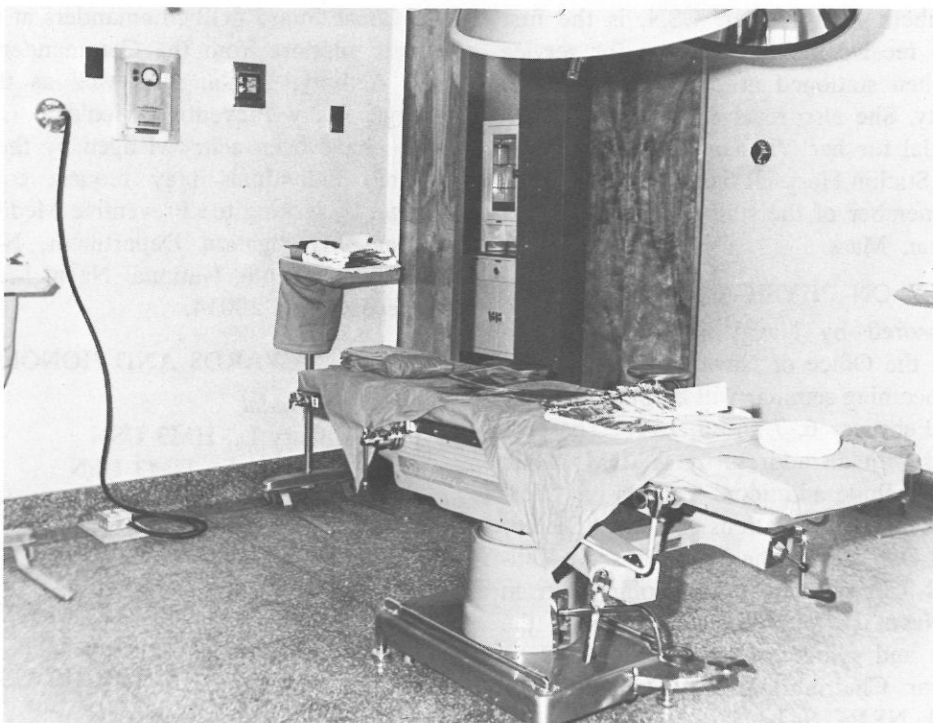
CAPT Louis H. Roddis, MC, USN, Retired, died at the age of 83 years on 19 October 1969, at San Diego, Calif. He was widely known and respected as an author, editor and medical historian.

A graduate of the University of Minnesota Medical School, CAPT Roddis entered the Navy in 1913. He retired in March 1948 but remained on active duty until June 1950. Best known for his "Short History of Nautical Medicine," he served three terms as editor of the Navy Medical BULLETIN during various periods of duty in BUMED as Chief of Publications Division. In addition, he published several books privately, including biographies of several Medical Greats and the "Indian Wars of Minnesota." He was a specialist in Allergy and Tropical Medicine.

Dr. Roddis was a prolific writer, in medical history especially. He was awarded the Sir Henry Wellcome Prize and Medal (1943) for a paper on the treatment of burns in war. As senior editor of the Navy Medical History of World War II, he remained on active duty following his retirement. He subsequently worked on various medical history monographs until shortly before his death. His passing is noted with much regret by all those who knew him.

#### NOTEWORTHY "FIRSTS"





Establishment of a major human tissue bank was accomplished at the Naval Hospital in San Diego, Calif., in October 1969. LT John L. Weinerth, MC, USN, officer in charge, reported that the bank collects and stores freeze-dried bone, skin, heart valves, nerves, fascia and dura. Fresh corneas and other eye tissues are supplied for direct transplantation. Collected tissues are placed in a liquid nitrogen freezer operating at  $212^{\circ}$  below zero, packed in dry ice and shipped to Bethesda, Md., for dehydration and vacuum sealing. (The facility at Bethesda is located at the Navy Medical Research Institute.) The tissues are then returned to San Diego for storage at room temperature. The new San Diego tissue bank has been permanently sealed to maintain a sterile environment and only bank personnel may enter. CAPT Robert M. Dimmette, Chief of Pathology and Research Committee Chairman at the Naval Hospital in San Diego, looks forward to the day when the tissue bank will acquire its own freeze-drying equipment, possibly in about two years. Cooperative plans with civilian medical centers in the area will develop as military needs are met. Existing comparable tissue banks are situated in Bethesda, Md.; Birmingham, England; Warsaw, Poland; and Prague, Czechoslovakia. Another is being developed in Japan.

RADM H. D. Warden, MC, USN, Commanding Officer at Naval Hospital, San Diego, Calif., was pre-

sented the Meritorious Service Medal in November 1969 for his professional role in working with the repatriated crew of the *Pueblo*. This new award was authorized to recognize outstanding duty performance not involving combat. RADM Warden praised the entire hospital staff for their help and support during the stay of the *Pueblo* crew members.

CDR Helen L. Brooks, NC, USNR, was awarded the Legion of Merit for distinguished service from July 1968 to July 1969 while serving as Chief, Nursing Service, at the Station Hospital, U.S. Naval Support Activity, DaNang. She is the first Navy Nurse to receive this award for service in Vietnam. CDR Brooks is now Chief of the Nursing Service at Naval Hospital, Charleston, S.C.

CAPT Geraldine A. Houp, NC, USN, retired from active duty on 1 November 1969 at Naval Hospital, St. Albans, N.Y., where she had been serving as Chief of Nursing Service. Following her retirement ceremony, the highly admired officer received a plaque from the Chief Petty Officers at the hospital making her an Honorary Chief, the first nurse at St. Albans (possibly in the Navy) to retire as both a Captain and a Chief Petty Officer. CAPT Houp was entitled to wear the National Defense Service Medal, World War II Victory Medal and the American Campaign Medal during the course of her naval career.



LCDR Elizabeth Ann Barker, USN, is the first Navy Nurse to receive the Bronze Star for service in Vietnam, when stationed at the DaNang Naval Support Activity. She also received the Navy Commendation Medal for her Vietnam service and was assigned to the Station Hospital there. Lcdr Barker is currently a member of the staff at Chelsea Naval Hospital, Boston, Mass.

#### SEMINAR ON PHYSICAL FITNESS

Jointly sponsored by Naval Reserve Research Unit 9-10 and the Office of Naval Research (Chicago), the forthcoming seminar will be held at Great Lakes, Ill., on February 6, 7 and 8, 1970. The program will open with an address by RADM Alban Weber and will include additional lectures on "Nervousness, Tension and Frustrations of Life", "Dietary Control", "Self Defense for the Naval Reserve Officer", "Physical Conditioning". Staff officers from Great Lakes Naval Hospital are noted among the list of speakers and gymnastic participation will be offered. Seminar Chairman is LT Arnold Pock, MSC USNR-R, NRRC 9-10.

Naval Reserve Research Company 9-10 has held many seminars in the past and continues to promote greater unity between the Regular Navy and the Research Reserve with Navy-wide interest programs. On Jan 23, 1970, RADM Owen, Chief, Office of Naval Research, Washington, will present an award to NRRC 9-10, Evanston, Ill., for being selected as an outstanding research unit nationally.

#### IDENTIFICATION OF MAMMALS IN SOUTH VIETNAM

"Preliminary Identification Manual for Mammals of South Vietnam" is an attractive, well-illustrated, paper-back book which is primarily distributed, for retention, to DOD Medical Department personnel in the field. It was prepared by Naval Medical Research Institute personnel with the active encouragement of members of the Department of Vertebrate Zoology, U.S. National Museum, Smithsonian Institution, City of Washington, to enable field medical personnel to identify species of wild mammals occurring in South Vietnam. Assistance of U.S. Navy, Marine Corps

and Coast Guard field commanders at all levels, and logistic support from the Commander, Naval Support Activity, DaNang, as well as the Officer-in-Charge, Navy Preventive Medicine Unit, DaNang, RVN, have been acknowledged by the authors. Interested individuals may request copies, without charge, by writing to: Preventive Medicine Division, Clinical Investigation Department, Naval Medical Research Institute, National Naval Medical Center, Bethesda, Md. 20014.

#### AWARDS AND HONORS

##### *Silver Star Medal*

Barnes, Gary L., HM3 USN  
Poague, Benny E., HM3 USN  
Radonovich, Michael F., HM2 USN

##### *Legion of Merit*

Boggs, Clifford W., CDR MSC USN  
Canada, Robert O., Jr., RADM MC USN  
Cuttle, Tracy D., CAPT MC USN  
Stover, John H., Jr., CAPT MC USN

##### *Navy and Marine Corps Medal*

Wheeler, Donald H., HM3 USN

##### *Bronze Star Medal*

Barker, Elizabeth A., LCDR NC USN  
Corb, Jack S., Jr., HM2 USN  
Deyton, John W., Jr., CDR MC USN  
Fletcher, William E., LCDR MSC USN  
Hood, Tipkins, LCDR MC USN  
Kravetz, Neil D., LCDR MC USN  
Martin, Richard E., HMC USN  
Pollak, Sanford, LT MC USNR  
Zelko, James J., LCDR MC USNR

##### *Air Medal*

Rasco, Jerry L., LCDR MC USNR

##### *Meritorious Service Medal*

Forrester, George G., Jr., LCDR MSC USN  
Jones, William H., CDR MSC USN  
Kingston, James R., CAPT MC USN  
Small, Milton M., CAPT MC USN  
Smith, Orville E., CAPT MSC USN  
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## United States Navy Medical Newsletter

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